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CLARK, TALIAFERRO,  
SYDENSTRICKER, EDGAR,  
COLLINS, SELWIN } □

HEIGHTS AND WEIGHTS  
OF SCHOOL CHILDREN

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TREASURY DEPARTMENT  
UNITED STATES PUBLIC HEALTH SERVICE  
HUGH S. CUMMING, SURGEON GENERAL

# HEIGHTS AND WEIGHTS OF SCHOOL CHILDREN

A STUDY OF THE HEIGHTS AND WEIGHTS OF 14,335  
NATIVE WHITE SCHOOL CHILDREN IN MARYLAND,  
VIRGINIA, AND NORTH AND SOUTH CAROLINA

BY

TALIAFERRO CLARK  
*Surgeon*

EDGAR SYDENSTRICKER  
*Statistician*

AND

SELWYN D. COLLINS  
*Assistant Statistician*  
*United States Public Health Service*

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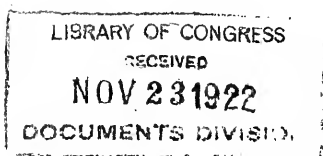


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## HEIGHTS AND WEIGHTS OF SCHOOL CHILDREN.

### A Study of the Heights and Weights of 14,335 Native White School Children in Maryland, Virginia, and North and South Carolina.<sup>1</sup>

By TALIAFERRO CLARK, Surgeon; EDGAR SYDENSTRICKER, Statistician; and SELWYN D. COLLINS, Assistant Statistician, United States Public Health Service.

#### Introductory.

A number of so-called standards of the physical development of children are in more or less general use in this country, largely for determining the state of nutrition. For the most part these standards represent averages of measurements made by different observers in widely separated communities, without reference to racial stock or geographical distribution. For purposes of comparison and in order to present anthropometrical observations for groups that are fairly homogeneous with respect to race stock and geographic location in the United States, selections of records were made from a considerably larger amount of material collected in a series of field investigations in child hygiene by Public Health Service officers during the last six years.

The present study deals with 14,335 white children of native parentage in representative localities in Maryland, Virginia, and North and South Carolina. The observations are confined to children actually attending school, ranging in age from 6 to 16 years, inclusive. While in every case a somewhat intensive physical examination (and for a considerable proportion, mental examination) was made, all children regardless of their physical or mental status, were included. The observations, therefore, may be said to be of a typical school population within the racial and geographical limits mentioned; they include the handicapped individuals, as far as handicapped individuals were found attending school, as well as the probable normal.

A considerable variety of anthropometrical records was collected for each individual in addition to records of physical defects and mental status. The present study, however, is confined to observations on standing height and weight. The presentation of the other data is reserved for later publications.

<sup>1</sup> From *Field Investigations in Child Hygiene*, United States Public Health Service, in cooperation with the Statistical Office, United States Public Health Service. Reprint from the *Public Health Reports*, vol. 37, No. 20, May 19, 1922, pp. 1185-1207.

## SCOPE OF THE STUDY.

A statistical study of the height and weight records of the 14,335 children was made along the following lines:

1. A series of comparisons of the mean heights and weights at different ages for the two sexes for the purposes (a) of discovering such differences as might exist at various ages between boys and girls with respect to height, weight, and the relation of weight to height; and (b) of observing the rates of growth in these respects during the period of 6-16 years.

2. The degree of variation in heights and weights at each age for either sex in terms of the standard deviation and the coefficient of variability.

3. The degree of correlation between the heights and weights of individuals of either sex at each age, using the correlation coefficient and ratio and regression coefficient as expressions of the relation.

4. The construction of a table of heights and weights according to single years of age for boys and for girls of the particular racial group and geographical section selected.

The detailed data and certain statistical constants derived therefrom are presented for reference in appended tables.

## GENERAL CONSIDERATIONS.

*Residential distribution.*—The school children here considered were from various rural districts, small towns, and cities of moderate size in the four States mentioned. Their distribution according to locality is shown in Table I.

TABLE I.—*Distribution of 14,335 children observed for height and weight according to locality of residence.*

Name of locality.	Nature of locality with approximate population of urban localities.	Number of children observed.
Frederick County, Md. ....	Rural, village, and Frederick, town (10,000).	4,348
Petersburg, Va. ....	City (30,000).....	1,748
Hampton, Va. ....	Town (6,000).....	1,153
Charlotte, N. C. ....	City (45,000).....	3,822
Spartanburg, S. C. ....	City (20,000) and near-by mill villages...	2,562
Greenville, S. C. ....	City (20,000).....	702

It is believed that these localities are fairly representative of the section included within the four States. As mentioned above, in order to exclude differences in race stock as far as possible, except in so far as native-born persons in this section are affected by them, the 14,335 individuals selected are of native-born white parentage.

*Sex and age distribution.*—The sex and age distribution of the children are shown in Table II.

TABLE II.—*Distribution according to sex and age of 14,335 native white children observed for weight and height in certain localities in Maryland, Virginia, North and South Carolina.*

Age at nearest birthday (years).	Number.		Per cent.	
	Boys.	Girls.	Boys.	Girls.
All ages.....	7,132	7,203	100.0	100.0
6.....	380	353	5.3	4.9
7.....	745	735	10.4	10.2
8.....	904	854	12.7	11.9
9.....	889	900	12.5	12.5
10.....	973	936	13.6	13.0
11.....	871	847	12.2	11.8
12.....	781	805	11.0	11.2
13.....	679	695	9.5	9.6
14.....	471	528	6.6	7.3
15.....	278	331	3.9	4.6
16.....	161	219	2.3	3.0

The age at nearest birthday is employed in this study.

The distribution according to age is quite similar for the two sexes, although, as was expected, a slight preponderance of girls is to be noted at the ages 14 to 16, inclusive, because of the greater tendency on the part of older boys to quit school.

For both sexes the numbers observed at the ages of 6 to 14, inclusive, are sufficiently large to constitute reasonably fair samples of the population of this section. Less dependence can be placed on the representativeness of the data for the ages 15 and 16 because of the relatively small numbers of children comprising these age groups. This should be borne in mind when certain irregularities appear in the analysis which seem to be peculiar to the ages named.<sup>2</sup>

### I. Mean Heights and Weights.

The measurements of children considered in this study were all made by medical officers of the United States Public Health Service in the schools of the various localities included. The children were measured as they were dressed, and in shoes except when the child was attending school barefooted. Weights were taken with wraps and heavy coats removed, leaving only the ordinary indoor clothing.

The measurements are so classified that the mid-points of unit classes fall on the even inch and the even pound.

#### MEAN HEIGHTS AND WEIGHTS OF BOYS AND GIRLS AT DIFFERENT AGES.

The basis for the first series of comparisons is given in the table of mean (arithmetic average) heights and weights<sup>3</sup> (Table III).

<sup>2</sup> The probable errors of the mean heights and weights at each age are given in appendix, Table XXI.

<sup>3</sup> The mean rather than the median or modal heights and weights have been used for the reason that the means appear to be satisfactory expressions. The modes are difficult to define in some instances because of somewhat irregular distributions due to small numbers. The medians are in all instances somewhat lower than the means, but their variations are similar in all essential respects to those of the means. (See appendix, Table XXI.) Furthermore, the means are more useful in comparing our results with those of other studies, and are more desirable in expressing degrees of dispersion and correlation.

TABLE III.—*Mean heights and weights of 14,335 native white children in Maryland, Virginia, North and South Carolina, at each age, compared for boys and girls.*<sup>1</sup>

Age at nearest birth-day (years).	Height (inches).		Weight (pounds).	
	Boys.	Girls.	Boys.	Girls.
6.....	45.4	44.8	47.5	45.5
7.....	46.8	46.6	50.4	48.3
8.....	48.8	48.5	54.5	52.4
9.....	50.7	50.5	59.6	58.0
10.....	52.6	52.5	65.2	64.0
11.....	54.3	54.5	71.1	70.3
12.....	56.2	57.0	78.0	79.7
13.....	58.0	59.3	85.1	89.7
14.....	60.3	61.1	95.4	99.4
15.....	62.9	62.5	108.4	107.6
16.....	64.6	63.3	116.7	113.6

<sup>1</sup> Probable errors of the means are shown in appendix, Table XXI.

The differences between the means for boys and girls at a given age period are not great, but they are significant. Table IV, showing the differences, will assist in making the comparison from this point of view:

TABLE IV.—*Comparison of the mean heights and weights (as given in Table III), showing the excess in favor of either sex at different ages.*

Age at nearest birth-day (years).	Excess in the mean—			
	Height of—		Weight of—	
	Boys over girls (inches).	Girls over boys (inches).	Boys over girls (pounds).	Girls over boys (pounds).
6.....	0.6	.....	2.0	.....
7.....	.2	.....	2.1	.....
8.....	.3	.....	2.1	.....
9.....	.2	.....	1.6	.....
10.....	.1	.....	1.2	.....
11.....	.....	0.2	.8	.....
12.....	.....	.8	.....	1.7
13.....	.....	1.3	.....	4.6
14.....	.....	.8	.....	4.0
15.....	.4	.....	.8	.....
16.....	1.3	.....	3.1	.....

It will be noted in the group studied that on the average at the ages of 11 to 14, school girls are taller than school boys, and that at the ages of 12 to 14 the girls are also heavier. This observation merely corroborates for the particular racial and geographic group under consideration what has been found by other observers to be uniformly true during the period of puberty.

## WEIGHT-HEIGHT INDEX.

The relation of weight to height, commonly expressed in the form of the ratio of weight to height at each age and called the weight-height index, is shown in Table V.



TABLE V.—*Weight-height indices, or the ratios of mean weight to mean height, at each age for 14,335 native white children in Maryland, Virginia, North and South Carolina, compared for boys and girls.*

Age at nearest birthday (years).	Mean weight in pounds Mean height in inches =	
	Boys.	Girls.
6.....	1.05	1.02
7.....	1.08	1.04
8.....	1.12	1.08
9.....	1.18	1.15
10.....	1.24	1.22
11.....	1.31	1.29
12.....	1.39	1.40
13.....	1.47	1.51
14.....	1.58	1.63
15.....	1.72	1.72
16.....	1.81	1.79

The differences in the indices for the sexes, it will be noted, occur at the same ages, approximately, as the differences in weights and heights considered separately. Computed from Table V, they are given for convenience in Table VI.

TABLE VI.—*Comparison of the mean weight-height index (as given in Table V) showing the excess in favor of either sex at different ages.*

Age at nearest birthday (years.)	Excess in the mean weight-height index (pounds per inch of height).	
	Boys over girls.	Girls over boys.
6.....	0.03	.....
7.....	.04	.....
8.....	.04	.....
9.....	.03	.....
10.....	.02	.....
11.....	.02	.....
12.....	.....	0.01
13.....	.....	.04
14.....	.....	.05
15.....	.....	.....
16.....	.02	.....

Here, again, it is found that the results correspond in a general way to those of similar studies of other groups of children. The boys are heavier than the girls for each inch of height at the ages of 6 to 11, both inclusive, and at 16. At the ages 12 to 14 the girls weigh more than the boys, and at 15 no difference appears for this group of children.

#### RATE OF INCREASE IN HEIGHT AND WEIGHT.

The series of means given in Tables III and V suggest an interpretation from the point of view of development; and considered in this light, although constituting observations of different individuals

at each age, they approximate the records of growth of the same individuals.

The rate of increase in height and weight or in the weight-height index is not easily seen from the tables of means and ratios. Per-

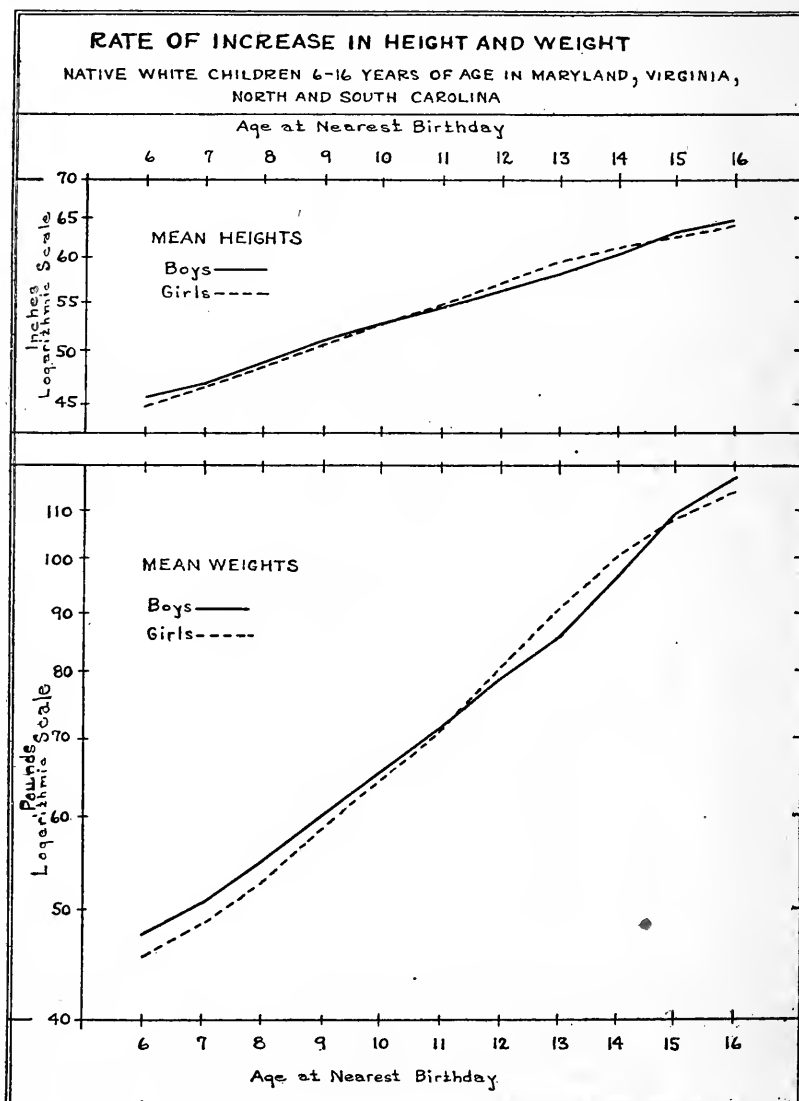


FIG. 1.

haps the quickest and simplest way to show it is to plot them on a logarithmic vertical scale. The means in Table III have been plotted in Figure 1.<sup>4</sup>

<sup>4</sup> In constructing the vertical scales for height and weight the spacing has been so arranged as to allow approximately the same space for an inch of height as for a pound in weight. The horizontal scales correspond exactly. The *slope* of the four lines, therefore, is comparable.

The curves also illustrate graphically the comparison of the actual mean heights and weights of boys and girls at different ages.

If the mean heights or weights fall in an absolutely straight line on a logarithmic scale (the scale being so constructed as to give the same results had the logarithms of the means been plotted on ordinary cross-section paper), obviously the rate of increase is unchanging. There are, however, quite definite curves in the lines connecting the points, indicating as other investigators have pointed out, that the rate of increase in either height or weight varies at different ages for both boys and girls. The rate of increase in the height of boys shows a tendency to slacken between the ages of 11 and 13; and the same slackening is seen for girls, but not until the age of 13. The mean weights of boys show an accelerating rate of increase until the age of 15, with a marked impetus at the age of 13. For girls the weight curve rises more rapidly than for boys up to the age of 13, where the slackened rate of increase begins and continues through the last year of age (16) for which data are available.

These variations in the rate of increase are expressed numerically in Table VII.

TABLE VII.—*Percentages of annual increase in mean height and mean weight of 14,335 native white children in Maryland, Virginia, North and South Carolina, compared for boys and girls.*

Age period.	Percentage increase in—			
	Height.		Weight.	
	Boys.	Girls.	Boys.	Girls.
6 to 7 <sup>1</sup> .....	4.0	4.1	6.1	6.2
7 to 8.....	3.9	3.9	8.1	8.5
8 to 9.....	3.9	4.4	9.4	10.7
9 to 10.....	3.8	3.8	9.4	10.3
10 to 11.....	3.1	3.9	9.0	9.8
11 to 12.....	3.4	5.2	9.7	13.4
12 to 13.....	3.4	4.2	9.1	12.5
13 to 14.....	4.0	2.9	12.1	10.8
14 to 15.....	4.7	2.0	13.6	8.2
15 to 16.....	3.0	1.5	7.7	5.6

<sup>1</sup> All ages are those at nearest birthday.

The relatively faster increase in weight than in height suggests, of course, that the weight-height index increases as children grow older. The curves constructed by plotting the weight-height indices in Table V on a logarithmic scale are shown in Figure 2.

Beginning at about 8 years of age the rate of increase in the weight-height index is markedly slower for boys than for girls up to the age of 13 or 14. Thereafter the opposite is true.

The means given in Table V may be used in still another way in considering the question of growth in weight in relation to height.

If the annual increment in weight be divided by the annual increment in height for the corresponding year of age, we will obtain a series of figures showing the annual increase in weight per each inch of increase in height. Table VIII presents the annual increments computed from the means given in Table III and the ratios found in the manner suggested.

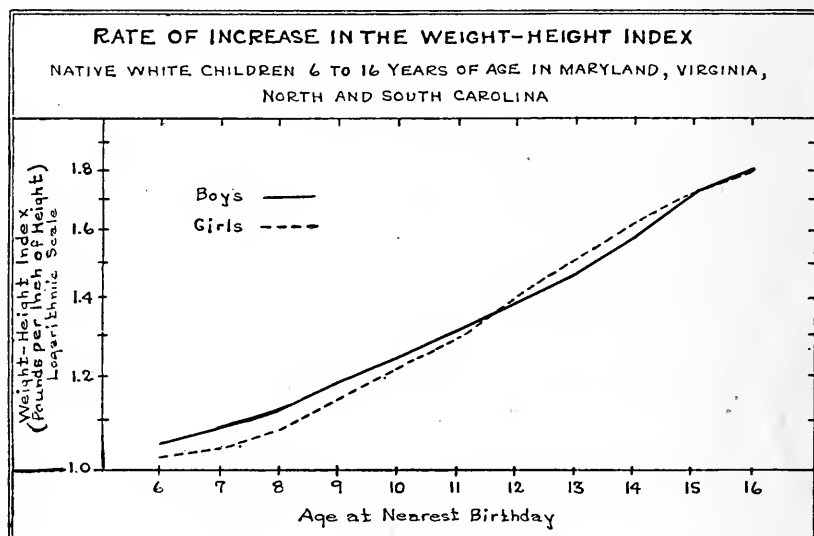


Fig. 2.

TABLE VIII.—Annual increments in pounds of weight for each inch of increment in height computed from mean weights and heights of 14,335 native white children in Maryland, Virginia, North Carolina, and South Carolina, compared for boys and girls.

Age period.	Annual increment.				Annual increment in weight (pounds) for each inch of increment in height.	
	For boys.		For girls.		Boys.	Girls.
	In height (inches).	In weight (pounds)	In height (inches).	In weight (pounds).		
6 to 7 <sup>1</sup> .....	1.4	2.9	1.8	2.8	2.1	1.6
7 to 8.....	2.0	4.1	1.9	4.1	2.1	2.2
8 to 9.....	1.9	5.1	2.0	5.6	2.7	2.8
9 to 10.....	1.9	5.6	2.0	6.0	2.9	3.0
10 to 11.....	1.7	5.9	2.0	6.3	3.5	3.2
11 to 12.....	1.9	6.9	2.5	9.4	3.6	3.8
12 to 13.....	1.8	7.1	2.3	10.0	3.9	4.3
13 to 14.....	2.3	10.3	1.8	9.7	4.5	5.4
14 to 15.....	2.6	13.0	1.4	8.2	5.0	5.9
15 to 16.....	1.7	8.3	.8	6.0	4.9	7.5

<sup>1</sup> All ages are those at nearest birthday.

The ratios in the two last columns, when considered as two series, merely indicate in another way the differences in the direction of growth of boys and girls. They have been plotted on a logarithmic scale in Figure 3.

The gain in weight by girls for each inch of gain in height increases at an almost constant rate from 7 to 16 years. Allowing for certain irregularities in the data, the gain in weight by boys for each inch of gain in height is practically the same as that by girls up to the age of 11, and thereafter is at a considerably slower rate.

COMPARISON OF MEASUREMENTS OF INDIVIDUALS OF DIFFERENT AGES WITH PERIODIC MEASUREMENTS OF A SINGLE GROUP OF INDIVIDUALS.

A number of observers have objected to height and weight standards based on measurements of children taken in cross section, at

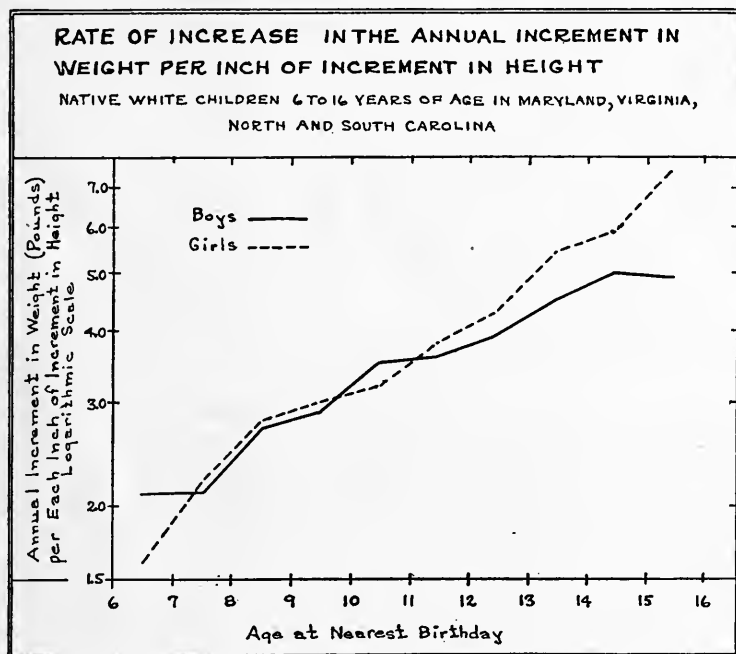


Fig. 3.

different age periods, on the ground that such measurements do not furnish an accurate index of the rate of growth. It has been suggested that such an index can be determined with appreciable accuracy only by making periodic measurements of the same children over a number of years. On the other hand, an index determined by periodic measurements requires time, while the need for fairly reliable standards by which to gauge the state of nutrition is pressingly present. Furthermore, such a group of children, of necessity, will be a selected group which finally, through process of elimination, is likely to be composed of a relatively small number of the surviving fittest who are benefited by special contact with health educational methods. There is the danger, therefore, that the end results will not be applicable for comparison with children not subjected to special influences, and with children of other sections of the country.

Although the measurements made by the United States Public Health Service constitute observations of different groups of individuals at each age, they may be compared with successive observations of a single group of individuals. Using the records recently published by Prof. B. T. Baldwin, the following comparison is afforded.<sup>5</sup>

TABLE VIII-A.—*Mean heights, mean weights, and mean weight-height indices of children of different ages measured by the United States Public Health Service, compared with corresponding measurements made periodically on a single group of children by Dr. B. T. Baldwin.*

Age at nearest birthday.	Height (inches).				Weight (pounds).				Weight-height index (pounds).			
	Boys.		Girls.		Boys.		Girls.		Boys.		Girls.	
	U. S. P. H. S.	Baldwin.	U. S. P. H. S.	Baldwin.	U. S. P. H. S.	Baldwin.	U. S. P. H. S.	Baldwin.	U. S. P. H. S.	Baldwin.	U. S. P. H. S.	Baldwin.
6.....	45.4	45.4	44.8	44.3	47.5	45.2	45.5	42.6	1.05	0.99	1.02	0.96
7.....	46.8	47.8	46.6	46.8	50.4	50.6	48.3	48.0	1.08	1.05	1.04	1.02
8.....	48.8	49.8	48.5	49.1	54.5	55.3	52.4	53.8	1.12	1.11	1.08	1.09
9.....	50.7	51.5	50.5	51.1	59.6	60.7	58.0	59.7	1.18	1.17	1.15	1.16
10.....	52.6	53.5	52.5	53.1	65.2	67.2	64.3	67.2	1.24	1.25	1.22	1.26
11.....	54.3	55.3	54.5	55.3	71.1	73.1	70.3	74.1	1.31	1.32	1.29	1.33
12.....	56.2	56.9	57.0	57.6	78.0	77.7	79.7	83.9	1.39	1.36	1.40	1.45
13.....	58.0	59.3	59.3	60.1	85.1	88.4	89.7	96.2	1.47	1.49	1.51	1.60
14.....	60.3	61.8	61.1	61.8	95.4	98.3	99.4	107.2	1.58	1.59	1.63	1.73
15.....	62.9	64.1	62.5	62.7	108.4	109.4	107.6	115.5	1.72	1.70	1.72	1.84
16.....	64.6	66.7	63.3	63.6	116.7	120.6	113.6	120.6	1.81	1.80	1.79	1.89

In the case of the boys, the height and weight curves follow the same general trend, with Baldwin's group slightly above that of the Public Health Service at practically every age. The weight-height indices for the two groups of boys are practically the same at each age except 6 years. In the case of the girls, the heights of the two groups follow much the same course, with a slight convergence of the curves at the older ages. The weight and the weight-height index curves for the girls show a tendency to diverge after 7 years of age, and the divergence is considerable by the age of 16. Some factor evidently influenced the growth of the girls measured periodically which failed to influence the girls measured by the United States Public Health Service. Otherwise the curves appear to be as similar as could be expected.

## II. Difference in Heights and Weights of Children of the Same Sex and Age.

Thus far comparisons in this study have been made of average (mean) heights and weights, but at each age children differ considerably in these respects and the differences are greater at some ages than at others. The averages which have been studied do not take into account these differences because the average (arithmetic

<sup>5</sup> Physical Growth of Children from Birth to Maturity. By Bird T. Baldwin, University of Iowa Studies in Child Welfare, 1921. Baldwin's figures are based on semiannual measurements of an average of 125 boys and 125 girls from the Horace Mann School, Teachers' College, Columbia University, New York, for periods of 8 years or more. (P. 411.)

mean) does not show for any group of children the range of weights or heights, or the "dispersion" of weights or heights above and below the average.

The nature of these differences is shown by plotting the number of children at each height or weight. As in all biometrical distributions of this character, the distribution will be found to form a

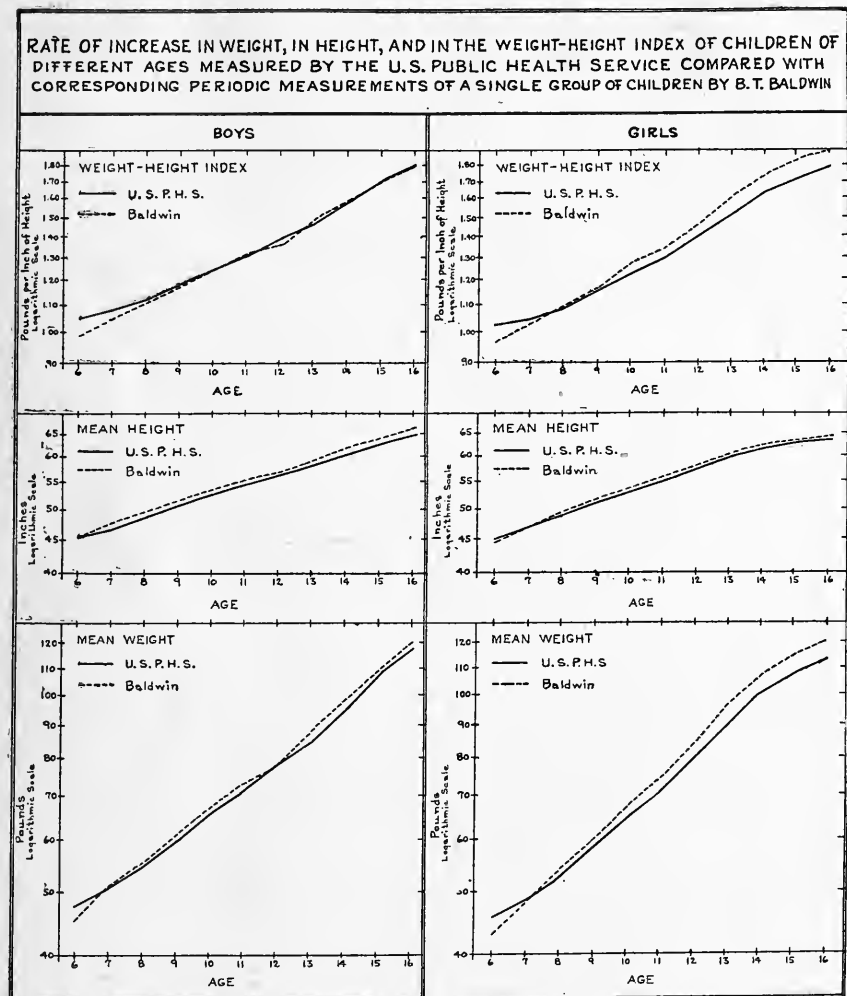


Fig. 3a.

more or less symmetrical frequency curve, which means that most of the children will tend to fall within rather narrow height or weight limits and fewer and fewer will fall in the classes toward either extreme. In plotting Figure 4, the percentages at each height or weight interval are used so as to reduce the data for the different ages to the same basis vertically.

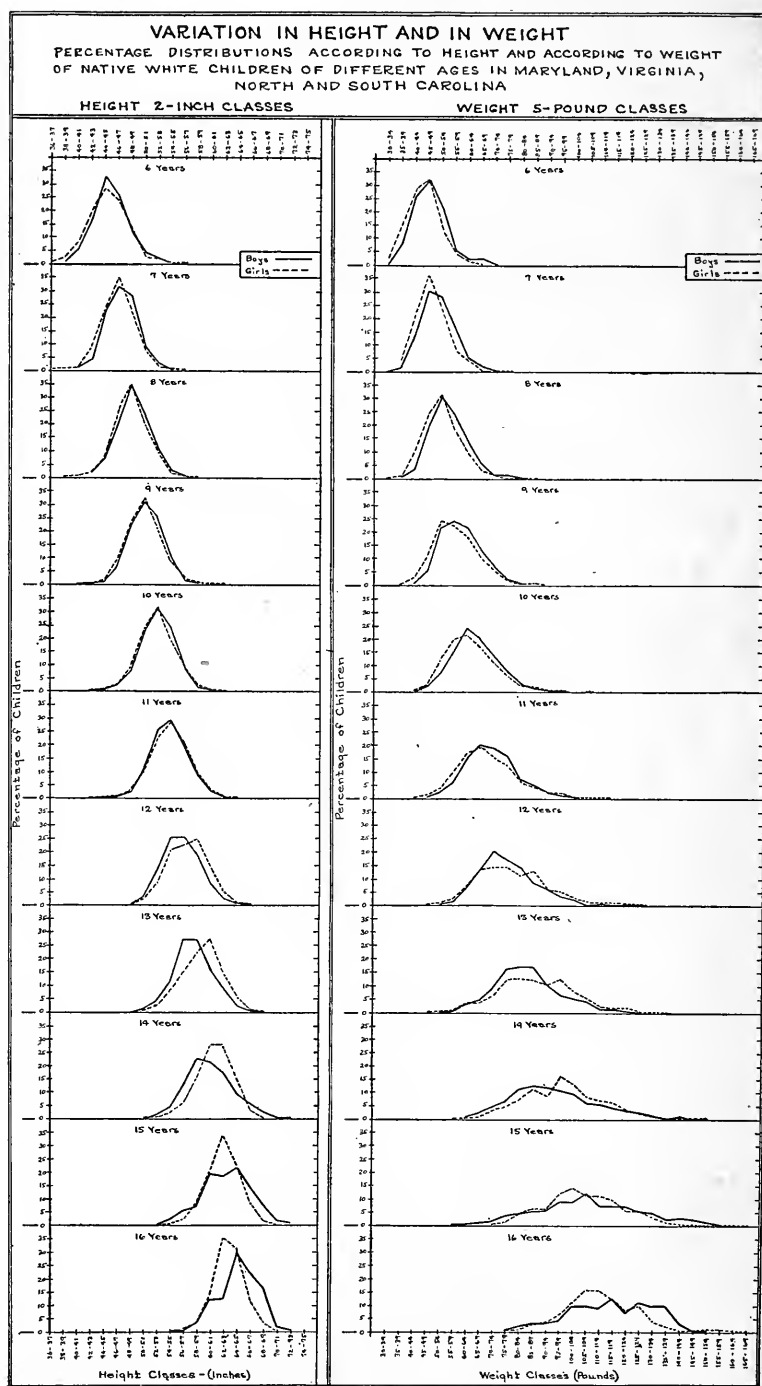


Fig. 4.



The differences in the *shape* of the curves for heights as well as for weights are quite marked when ages are compared. In general, the older the age, the flatter is the curve and hence the greater the dispersion. This means that children of a given age differ more widely in height or weight as they grow older. This statement should be qualified, however, for a closer study of the graphs affords the suggestion that the greatest dispersion or difference occurs at the age of puberty. Differences of this character are exhibited by both boys and girls.

## STANDARD DEVIATION IN HEIGHTS AND WEIGHTS.

A more nearly exact expression of these differences than that afforded by the graphic method is necessary. The usual statistical term used to express the degree of differences in distribution is the standard deviation ( $\sigma$ ), which, in turn, is expressed by ( $V$ ) the coefficient of variability as a percentage of the mean. As the  $\sigma$  or the  $V$  is large or small, so the differences in the individual heights or weights are large or small.

In Table IX are given the standard deviations in heights and weights at each age for boys and girls and the corresponding coefficients of variability.

TABLE IX.—*Variation in heights and weights of boys and girls of the same age.*

As expressed in standard deviations in standing heights and weights at each age of 14,335 native white children in Maryland, Virginia, North and South Carolina, and the corresponding coefficients of variability.

Age at nearest birthday.	Standard deviation.		Coefficient of variability.	
	Boys.	Girls.	Boys.	Girls.
STANDING HEIGHTS.				
6.....	2.77±0.068	3.21±0.081	6.10	7.17
7.....	2.58±.045	2.53±.044	5.51	5.43
8.....	2.54±.040	2.47±.040	5.20	5.09
9.....	2.66±.043	2.69±.043	5.25	5.33
10.....	2.64±.040	2.83±.044	5.02	5.39
11.....	2.82±.046	3.00±.049	5.19	5.50
12.....	3.03±.052	3.02±.051	5.39	5.30
13.....	2.93±.054	3.16±.057	5.05	5.33
14.....	3.83±.084	2.99±.062	6.35	4.89
15.....	3.85±.110	2.62±.069	6.12	4.19
16.....	2.99±.112	2.50±.081	4.63	3.95
WEIGHTS.				
6.....	7.76±0.190	7.27±0.185	16.34	15.98
7.....	6.56±.115	6.26±.110	13.02	12.96
8.....	7.13±.113	7.39±.121	13.08	14.10
9.....	7.98±.128	9.24±.147	13.39	15.93
10.....	9.09±.139	10.79±.168	13.94	16.86
11.....	10.30±.166	12.87±.211	14.49	18.31
12.....	12.43±.212	14.85±.250	15.94	18.63
13.....	12.84±.235	16.41±.297	15.09	18.29
14.....	17.52±.385	14.75±.306	18.36	14.84
15.....	20.46±.585	16.38±.429	18.87	15.22
16.....	17.12±.644	16.24±.523	14.67	14.26

The coefficient of variability is, of course, the best expression of the degree of variation, since it takes into account the size of the mean from which the deviations are measured. As the table and the graph (Fig. 6) clearly show, there are marked differences in this coefficient for weight at different ages for the same sex and, when the sexes are compared, for the same age. After the age of 7 the variation of weight increases with age up to 13 years for girls and 15 years for boys, and then decreases, the decrease thus beginning at an earlier age for girls than for boys.

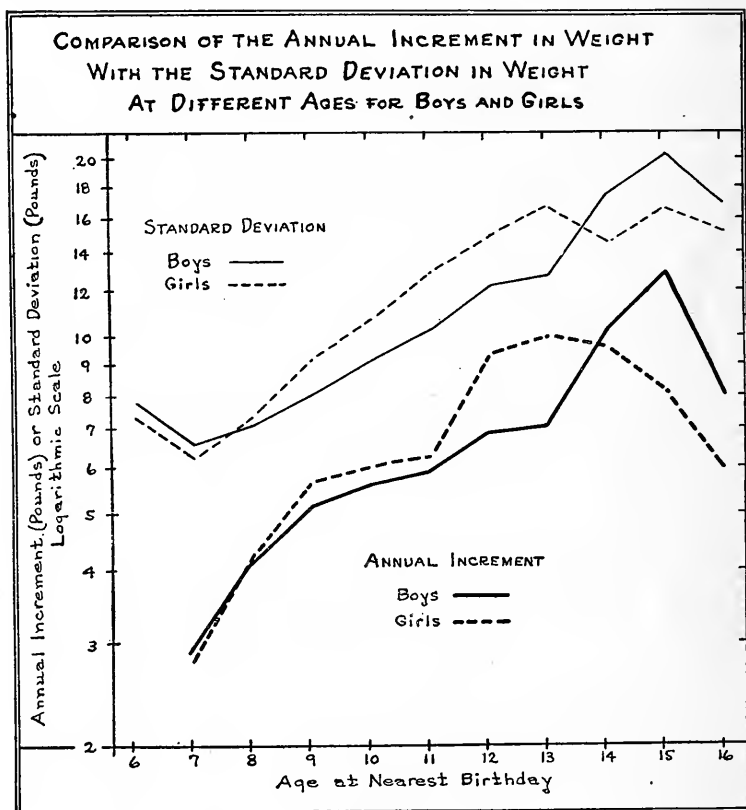


Fig. 5.

#### RATE OF GROWTH AND VARIATION IN WEIGHT.

It is of interest to inquire the reasons for the greater variation in weight at certain ages. While it might be due in part to a greater percentage of abnormal children at certain ages who may vary more from the mean than the normal children, the rapidity of growth as expressed by the mean annual increment in weight is definitely associated with variation in weight, as shown in Figure 5.

A comparison of the mean annual increment (see Table VIII) with the standard deviation (see Table IX) for the same sex shows this correlation in a more striking manner. The variation in weight seems to increase or decrease with the mean annual increment. That is to say, children vary most in weight at the periods of the most rapid increase in weight.

These differences from the point of view of sex are also striking. The degree of variation in weight for boys and girls of the same age

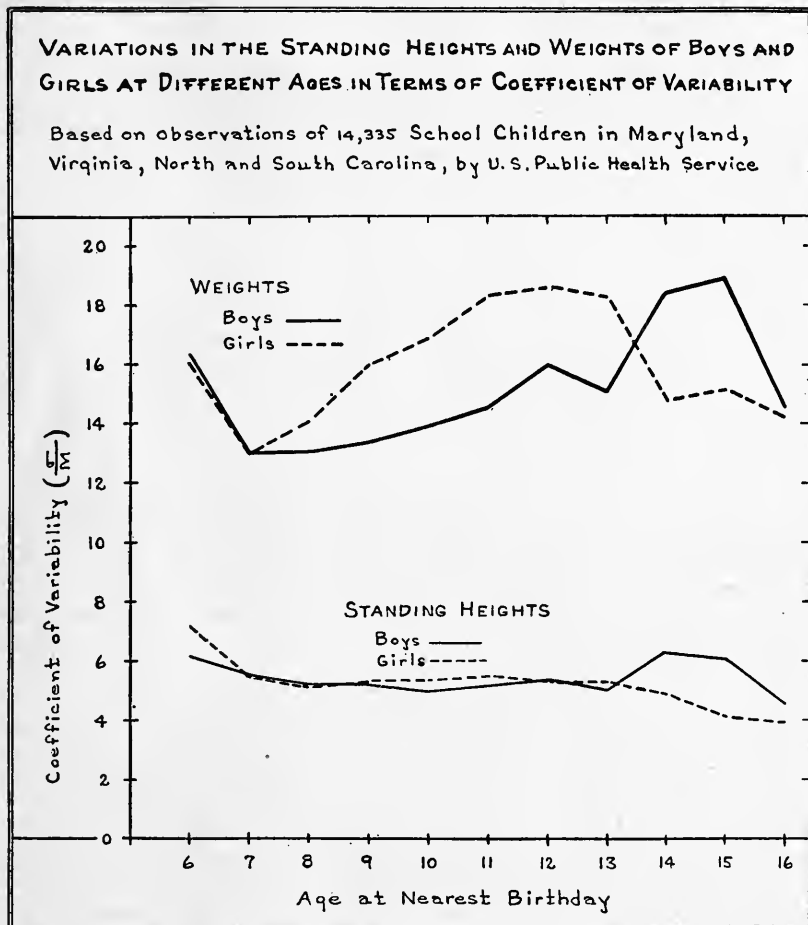


Fig. 6.

is by no means the same as the standard deviations (see Table IX and Figure 5, upper curves) clearly indicate. The same sort of differences between the sexes is shown when the annual increment in pounds is compared. (See Table VIII and Figure 5, lower curves.)

#### RELATION OF HEIGHT TO VARIATIONS IN WEIGHT.

In comparing the degree of variation in weights for boys and girls the factor of height must also be considered. The degree of variation

as expressed by the coefficient of variability is plotted for weights and heights for either sex in Figure 6.

Since the two sets of curves are quite different in some respects, an attempt has been made to see what the coefficients of variability in weight would be if no variation in heights had existed. This has been done by a method of averaging the coefficients of variability in weight for children of a given age at each inch of height, a method which is admittedly somewhat crude but accurate enough for the purpose in view.<sup>6</sup>

TABLE X.—*Variation in weights of boys and girls of the same age, after eliminating (roughly) the effect of variation in height.*

As expressed by the weighted averages of the coefficients of variability for weight at each inch of height.

Age at nearest birthday.	Averages of the coefficients of variability.	
	Boys.	Girls.
6.....	8.48	8.55
7.....	9.06	8.39
8.....	8.99	8.73
9.....	8.65	10.74
10.....	9.49	11.25
11.....	9.95	12.01
12.....	10.28	12.15
13.....	10.40	12.60
14.....	10.51	13.30
15.....	9.66	12.68
16.....	9.04	11.50

The results given in Table X are shown graphically in Figure 7.

It appears that girls over 8 years of age vary with respect to weight in a considerably greater degree than boys of the same age and of the same approximate height. The degree of variation is somewhat more pronounced after the age of 13.

### III. Correlation of Height and Weight.

Thus far the children of given age and sex have been considered from two standpoints: First, as constituting groups, using the average (mean) heights and weights of different sex-age groups for making comparisons; and, second, as individuals, using the standard deviation and coefficient of variability as measures of variation for determining the degree individual children differ in respect of height and weight. It now remains to consider the differences occurring in individual children in each group from the point of view of the relation of variation in height to variation in weight. That is, how closely do variations in height correspond to variations in weight among children of different ages and sexes? Obviously, if there is a very close relationship, there must be a marked uniformity in the

<sup>6</sup> See appendix, Tables XV and XVI, for the coefficients of variability at each height. The coefficients of variability in weight of children of a given age increase little, if any, with increase in height. It therefore seemed feasible to average these coefficients for a given age group in order to get an expression of the average relative variation in weight of children of any given height for that age.

weight of children, taking height into account; if there is not a very marked relationship, children of a given height, age, and sex will differ widely in weight. The importance of this phase of the discussion does not lie so much in demonstrating the fact that a relationship of this kind exists, since in the very nature of things it must exist, as in discovering the differences in degree of correlation for the various sex and age groups.

#### COEFFICIENT OF CORRELATION.

A comparison of this kind would be a very detailed and difficult task if no single measure of the relationship between the degree of

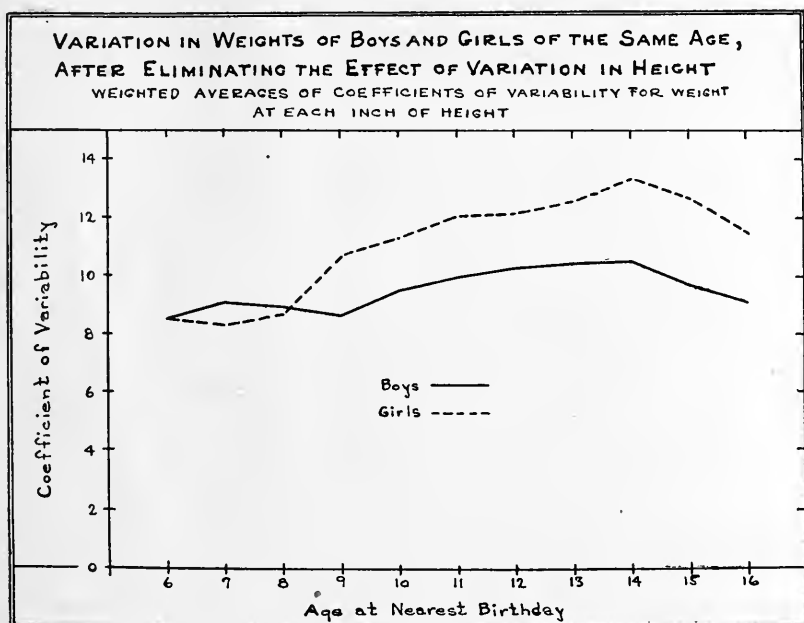


Fig. 7.

the two variations could be used. Such a statistical measure exists in the coefficient of correlation and the correlation ratio. When this coefficient or ratio is zero there is no relationship whatsoever. When it is 1, or unity, the relationship is perfect; that is, the variation in one (e. g., height) is accompanied by exactly the same variation, relatively, in the other (e. g., weight). The nearer unity, the closer the relationship between the two variables.<sup>7</sup>

<sup>7</sup> The coefficient of correlation ( $r$ ) is the generally used statistical measure of linear or straight line correlation between two variables. If the items (individuals) are plotted with heights as ordinates and weights as abscissae, and the points (or the means of the weights at the different heights) tend to fall along a straight line, the correlation is said to be linear. But if the points tend to fall along a curved line, the correlation is said to be nonlinear and, under certain conditions, the correlation ratio ( $\eta$ ) is a better measure of the correlation between the two variables. If the ratio ( $\eta$ ) is significantly larger than the coefficient ( $r$ ), it is an indication of nonlinearity.

In the case of the heights and weights of children in this study, the differences between the correlation ratio and the coefficient are not marked except at a few ages, but in practically every instance they are found to be significant if Blakeman's criterion of nonlinearity is applied. That is, the correlation ratio is a more nearly accurate expression of correlation than the coefficient for the material used in this study.

The correlation ratios as well as the coefficients of correlation for heights and weights of boys and girls at each age are given in Table XI, together with their probable errors. The correlation tables are given in the appendix.

TABLE XI.—*Correlation of standing heights and weights of native white children in Maryland, Virginia, North and South Carolina.*

Age at nearest birthday.	Correlation ratio of weight on height ( $\eta$ ).	Coefficient of correlation ( $r$ ).
BOYS.		
6.....	0.830±0.0108	0.782±0.0134
7.....	.704±.0125	.603±.0157
8.....	.718±.0109	.682±.0120
9.....	.744±.0101	.643±.0133
10.....	.720±.0104	.693±.0113
11.....	.726±.0108	.657±.0130
12.....	.736±.0111	.706±.0121
13.....	.720±.0125	.687±.0137
14.....	.816±.0104	.795±.0114
15.....	.853±.0110	.842±.0118
16.....	.784±.0225	.736±.0244
GIRLS.		
6.....	0.788±0.0136	0.675±0.0195
7.....	.725±.0118	.679±.0134
8.....	.751±.0101	.719±.0111
9.....	.724±.0107	.661±.0127
10.....	.709±.0110	.660±.0125
11.....	.695±.0120	.647±.0135
12.....	.719±.0115	.703±.0120
13.....	.707±.0128	.669±.0141
14.....	.692±.0153	.643±.0172
15.....	.543±.0262	.427±.0303
16.....	.592±.0296	.565±.0310

As may be expected, in all instances the correlation is high and, from the point of view of the probable error, significant. The degree of correlation, however, varies considerably in the different ages and as between boys and girls. These differences are not merely accidental, but indicate definite trends. In order to visualize the differences the correlation ratios have been plotted in Figure 8.

The correlation of height and weight is quite high at 6 years of age for both boys and girls in this particular group of children. From 7 to 13 years of age the correlation for both sexes is lower and similar, although that for the girls is slightly lower after 8 years than for boys. After the age of 13 there is a marked divergence, the correlation for boys being quite high and that for girls relatively low.

Stated in other words, the weights of both boys and girls vary in pretty much the same way as do the heights in the ages under the age of 14, the taller the children the more they weigh according to a fairly constant ratio; but in the ages 14 to 16, height or weight appear to be affected to a markedly greater extent by some other factor or factors.

## VARIATION IN WEIGHT PER INCH OF VARIATION IN HEIGHT.

This may be expressed more exactly by stating the variation in weight (pounds) per inch of variation in height at each age, as shown in Table XII, and graphically in Figure 9.<sup>8</sup>

TABLE XII.—*Variation in weight (pounds) per inch of variation in height compared for boys and girls at different ages.*

Coefficient of regression of weight on height of native white children of Maryland, Virginia, North and South Carolina by sex and age.

Age at nearest birthday.	Coefficient of regression of weight on height (pounds).	
	Boys.	Girls.
6.....	2.19	1.52
7.....	1.53	1.68
8.....	1.91	2.15
9.....	1.92	2.27
10.....	2.38	2.52
11.....	2.41	2.79
12.....	2.91	3.44
13.....	3.02	3.48
14.....	3.66	3.16
15.....	4.46	2.69
16.....	4.24	3.70

From 7 to 13 years, inclusive, the variation in weight per inch of variation in height was less among boys than girls; at 6, 14, 15, and 16 years of age the opposite was true.

## IV. Summary.

1. The basis of this study consists of height and weight measurements of 14,335 native white school children from 6 to 16 years of age made by officers of the United States Public Health Service in representative localities of Maryland, Virginia, and North and South Carolina.

2. The mean heights of the girls 11 to 14 years of age, inclusive, and the mean weights of the girls 12 to 14 years, inclusive, are greater than those of the boys of the same ages. At the other ages studied the boys are taller and heavier than the girls. The weight-height index (weight per inch of height) of the girls exceeds that of the boys from 12 to 14 years and is equal at 15 years; at the other ages studied, it is greater for boys than for girls.

3. The annual increment in weight of the girls exceeds that of the boys from 8 to 13 years, inclusive. At the other ages studied it is greater for boys. However, when the annual increment in weight

<sup>8</sup> The coefficient of regression of weight on height (computed from the coefficient of correlation ( $r$ ) for a given age indicates the *average* difference in weight (pounds) per inch of difference in height.

per inch of increment in height is considered, it is found greater for girls than boys at every age after 6, except 10 years.

4. Variations in height and in weight differ markedly for different sex-age groups and are closely associated with the rate of increase in weight. When variation in weight is considered independently of variation in height, the boys 14 to 16 years of age vary considerably more in weight than the girls of the same age. But when the effect of variation in height is eliminated, the girls vary more in weight than the boys of the same age at all ages above 8 years. In other

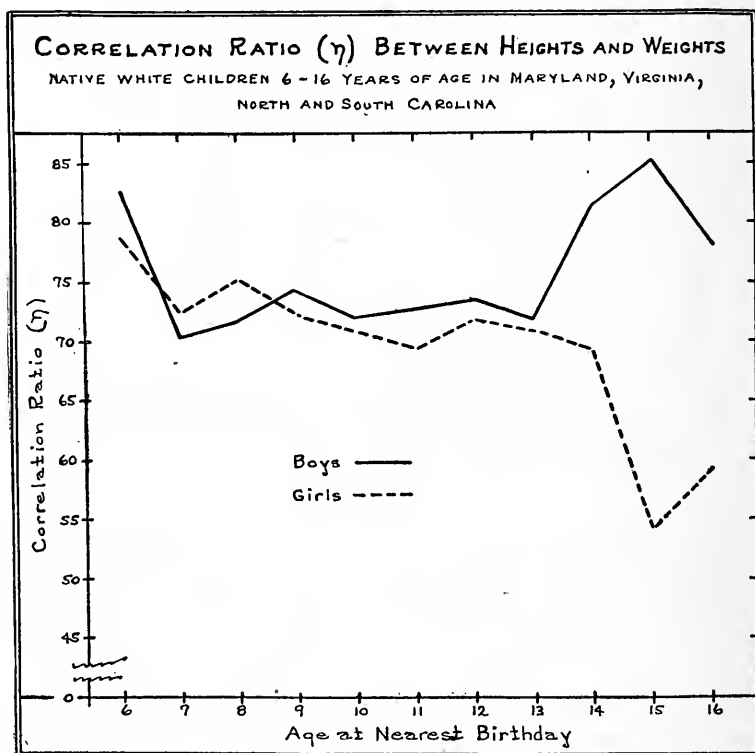


Fig. 8.

words, girls after 8 years of age vary more in weight than boys of the same age and height.

5. Correlation between heights and weights was found to be lower for the girls than for the boys at all ages above 8 years and markedly lower after 13 years of age.

#### V. Height-Weight Tables.

Since it appears that variability in weight differs with sex, age, and height, it seems that averages which best represent a group of children are those which take all of these factors into account. It there-



fore seemed best to present the final results of the study as average weights of boys and girls of each age, by height groups. A series of mean weights was therefore computed independently for children at each year of age and at each inch of height. In order to approximate the true average weights which would be the result of measuring an infinite number of children, it was necessary to smooth the weights computed independently. Smoothed averages were derived from data shown in the tables<sup>9</sup> in the appendix, by a formula from the

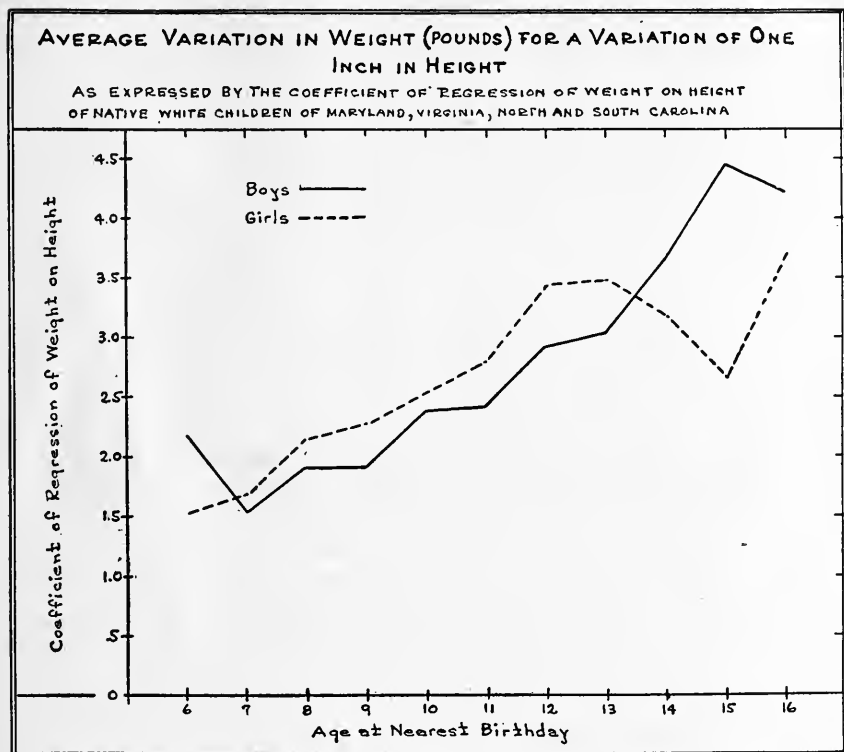


Fig. 9.

method of least squares, which give a series of weights representing the most probable smooth curve which could be constructed from the data.<sup>10</sup> The smoothed averages are shown in Tables XIII and XIV.

<sup>9</sup> The actual average weights, the standard deviations, and the coefficients of variability are given by single-year age groups and single inch-height classes in appendix Tables XV and XVI. The number of children whose measurements were considered in making up each average is also shown.

<sup>10</sup> Let  $Y$  = weight and  $X$  = height; then it was assumed that at any given height,  $X$ ,  $Y = a + bx + cx^2 + dx^3$ . The coefficients  $a$ ,  $b$ ,  $c$ , and  $d$  were evaluated by the method of least squares for each sex and age, and the smoothed weights were computed by substituting in the original equation.

[illegible][illegible]

No attempt was made to carry the smoothed mean weight series to the extreme limits of heights. In the first place reliable averages could not be computed because of the relatively small number of children observed. In the second place averages would probably not be good criteria of the correct weights of extremely short or extremely tall children, inasmuch as those who vary so widely in height from the mean could not be assumed to conform to any computed or assumed mean weights. It is not claimed, however, that this table reaches the limits of normality, especially in the older ages; but it appeared better to keep within safe limits where the data could be relied upon than to try to make a complete table if it were necessary to use unreliable figures for the extremes.

It is suggested that this table, which is based on measurements of native white children in four representative Southern States, might serve as a table of correct weights among such children of the South. The usual tables of this sort are based on measurements of children of various racial stocks or distinctly selected groups of children, and it would seem that a table, based on measurements of children of a single race stock from one section of the country, would better represent the white children of that section. It should be borne in mind, however, that the older ages, particularly the 16-year-old boys, probably are not representative, because of the small number considered and selection due to children dropping out of school.

## VI. Appendix.

### TABLES OF BASIC DATA.

In the following pages are given tables containing the basic data for the study. Tables XV and XVI show by sex, age, and height the mean weights, standard deviations, and coefficients of variability. These tables contain the basic data from which Tables XIII and XIV were computed. Tables XVII to XX, inclusive, show by sex and age the percentage distribution of children according to height by 1-inch classes, and according to weight by 5-pound classes. Table XXI shows the mean heights and weights with their probable errors and the median and quartile heights and weights by sex and age. Tables XXII to XXXII, inclusive, show the original data in correlation tables.







50	64.8	9.86	15.08	5	77.0	10.19	15.46	4	69.3	8.65	11.20	4	70.5	7.76	8.13	9	103.0	8.04
51	65.4	5.60	8.43	11	67.0	7.05	10.46	4	68.3	8.71	10.83	10	79.6	13.58	13.62	11	98.0	7.00
52	66.4	6.19	9.09	17	67.4	8.75	11.87	9	68.5	9.86	11.82	6	80.0	9.00	8.45	8	104.9	7.86
53	68.1	5.72	8.08	26	73.7	6.83	9.13	14	67.2	7.81	9.22	8	80.4	9.00	8.51	12	104.8	11.50
54	70.8	5.72	8.08	26	73.7	6.83	9.13	14	67.2	10.04	11.19	12	89.7	10.81	9.58	22	116.9	12.05
55	73.1	6.49	8.88	53	74.8	6.83	9.13	14	77.2	8.74	9.44	24	95.5	12.23	10.22	26	117.0	12.88
56	77.6	7.62	9.82	85	78.4	8.33	10.88	23	80.4	8.80	9.11	30	99.7	12.09	9.72	18	124.3	9.41
57	79.8	9.01	11.29	101	82.1	8.81	10.73	37	83.4	12.55	12.13	26	106.5	14.10	10.90	18	123.6	8.70
58	81.8	8.81	10.77	101	84.0	8.82	10.50	60	84.7	12.54	11.62	25	105.8	7.42	5.58	19	137.2	9.86
59	87.0	12.23	14.06	82	87.4	8.49	9.71	47	89.7	7.51	7.06	30	112.8	10.81	9.58	7	131.1	9.50
60	87.5	8.40	9.60	73	91.2	9.61	10.54	55	92.6	8.74	9.44	24	95.5	12.23	10.22	26	117.0	9.41
61	92.8	10.53	11.35	39	94.8	8.82	9.30	46	97.3	8.80	9.11	30	99.7	12.09	9.72	18	124.3	8.70
62	100.3	13.18	13.14	35	99.1	11.04	11.14	45	103.5	12.55	12.13	26	106.5	9.00	8.51	8	104.9	7.86
63	105.2	8.69	8.33	26	104.3	8.69	8.33	38	107.9	12.54	11.62	25	105.8	10.81	9.58	22	116.9	12.05
64	106.5	8.69	8.33	11	101.2	10.76	10.63	26	106.3	7.51	7.06	30	112.8	10.81	9.58	22	116.9	12.88
65	118.7	8.40	9.60	6	113.3	9.61	10.54	55	92.6	8.74	9.44	24	95.5	12.23	10.22	26	117.0	9.41
66	115.0	8.40	9.60	6	113.3	9.61	10.54	55	92.6	8.74	9.44	24	95.5	12.23	10.22	26	117.0	9.41
67	96.0	8.40	9.60	1	123.0	11.04	11.14	45	103.5	12.55	12.13	26	106.5	9.00	8.51	8	104.9	7.86
68	96.0	8.40	9.60	1	123.0	11.04	11.14	45	103.5	12.55	12.13	26	106.5	9.00	8.51	8	104.9	7.86
69	90.0	8.40	9.60	1	100.0	10.76	10.63	26	106.3	7.51	7.06	30	112.8	10.81	9.58	22	116.9	12.05
70	115.0	8.40	9.60	1	115.0	9.61	10.54	55	92.6	8.74	9.44	24	95.5	12.23	10.22	26	117.0	9.41
71	115.0	8.40	9.60	1	115.0	9.61	10.54	55	92.6	8.74	9.44	24	95.5	12.23	10.22	26	117.0	9.41
72	137.5	13.75	13.75	2	137.5	13.75	13.75	2	137.5	13.75	13.75	2	137.5	13.75	13.75	2	137.5	13.75

TABLE XVI.—Numbers, mean weights, standard deviations, and coefficients of variability in weight of native white children of Maryland, Virginia, North Carolina, and South Carolina, by sex, age, and height.

## GIRLS.

Height, nearest inch.	6 years.				7 years.				8 years.				9 years.				10 years.				11 years.				Height, nearest inch.
	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	Number of children.	Mean weight, pounds.	Standard deviation, pounds.	Coefficient of variation, billity.	
All heights.....	353	45.5			735	48.3			854	52.4			900	58.0			936	64.0			847	70.3			All heights.....
26.....	1	44.0																							26.....
27.....																									27.....
28.....																									28.....
29.....																									29.....
30.....	1	36.0											1	50.0											30.....
31.....																									31.....
32.....																									32.....
33.....																									33.....
34.....																									34.....
35.....	1	37.0																							35.....
36.....					1	56.0												1	50.0						36.....
37.....	1	49.0																							37.....
38.....	1	30.0			2	47.0			1	55.0															38.....
39.....	7	38.3																							39.....
40.....	12	36.3	2.95	8.13	1	36.0							1	80.0			2	53.5							40.....
41.....	17	41.8	3.64	8.71	6	40.3			2	45.0			2	59.5											41.....
42.....	41	40.2	3.60	8.96	24	42.4	3.87	9.13	1	35.0											2	67.5			42.....
43.....	29	42.0	3.87	9.21	42	41.6	3.76	9.04	11	41.4	2.31	5.58													43.....
44.....	47	43.4	4.14	9.54	62	44.0	3.46	7.86	23	42.8	2.61	6.10	3	45.0			3	61.3							44.....
45.....	53	45.3	3.74	8.26	101	44.5	3.59	8.07	42	44.6	4.70	10.54	9	47.9			4	60.8			2	66.0			45.....
46.....	48	46.1	3.30	7.16	122	46.8	3.45	7.37	87	46.8	3.76	8.03	30	47.9	5.10	10.85	8	45.8							46.....
47.....	35	54.9	4.54	9.23	129	48.8	4.10	8.40	123	49.4	4.42	8.95	56	49.5	6.03	12.18	11	50.8			5	51.0			47.....
48.....	22	50.5	4.20	8.32	99	50.8	4.25	8.47	163	51.0	4.82	9.45	91	51.2	4.80	9.37	35	52.7			8	57.3			48.....
49.....	21	52.6	4.07	7.74	69	53.2	4.23	7.95	136	53.2	4.53	8.52	116	54.1	6.31	11.66	50	54.7			18	51.8	5.97	11.53	49.....



[illegible]

## HEIGHTS AND WEIGHTS OF SCHOOL CHILDREN.

TABLE XVI.—Numbers, mean weights, standard deviations, and coefficients of variability in weight of native white children of Maryland, Virginia, North Carolina, and South Carolina, by sex, age, and height—Continued.

[illegible]

[illegible]

BOYS.

Height, nearest inch.	Age at nearest birthday.										
	6	7	8	9	10	11	12	13	14	15	16
All heights.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
26.....											
27.....											
28.....				.1							
29.....											
30.....											
31.....		.1									
32.....											
33.....											
34.....						.1					
35.....				.1	.1						
36.....		.1		.1					.2		
37.....		.1							.2		
38.....											
39.....	.8	.3									
40.....	1.3	1.1	.1	.1							
41.....	4.5	.1	.2	.1							
42.....	6.8	1.7	.7		.1					.4	
43.....	9.5	2.4	.8	.1							
44.....	15.8	8.2	2.0		.1	.1	.1				
45.....	17.1	13.6	4.5	.9	.3	.1		.1			
46.....	15.8	14.0	7.5	2.0	.9	.1	.3				
47.....	10.0	17.2	12.4	4.8	1.3	.3	.1				
48.....	7.9	17.0	17.4	9.3	3.0	1.1					
49.....	3.9	11.0	17.0	13.5	4.5	1.1	.4	.1	.2		
50.....	2.4	5.6	12.5	15.4	8.0	3.6	.8	.7			
51.....	1.8	3.9	11.2	15.7	14.4	6.4	2.6	.4		.4	
52.....	.8	2.1	6.6	14.3	16.0	11.1	5.2	1.6	.8		
53.....	.8	.7	3.8	10.7	15.8	14.7	7.9	2.5	.8		
54.....	.3	.1	1.7	7.1	14.5	16.1	11.4	3.8	1.9	.7	
55.....	.3	.4	.9	3.5	9.2	13.4	13.8	7.8	3.0	1.4	.6
56.....			.2	1.0	6.0	10.4	14.3	12.5	4.9	3.6	.6
57.....			.2	.6	3.2	9.1	11.1	14.9	7.9	2.2	.6
58.....			.2	.1	.9	5.6	9.9	14.9	12.7	2.9	3.1
59.....		.1	.1	.1	.7	3.3	9.1	12.1	10.0	4.3	.6
60.....					.5	1.7	4.2	10.8	11.7	8.6	5.6
61.....				.1	.1	.6	4.6	5.7	9.8	10.8	6.8
62.....	.3			.1		.2	2.0	5.2	9.6	9.4	5.0
63.....					.2	.3	.8	3.8	8.1	9.0	7.5
64.....						.1	.5	1.6	5.5	10.8	13.7
65.....						.1	.4	.9	4.2	11.2	16.1
66.....							.1		4.2	7.2	11.2
67.....							.1	.1	1.5	7.2	11.2
68.....									1.9	5.4	11.8
69.....							.1	.1	.2	2.2	4.3
70.....								.1	.2	1.8	1.2
71.....											
72.....									.4	.7	.6



BOYS.

[illegible]



TABLE XXI.—*Mean, median, and quartile heights and weights of native white children of Maryland, Virginia, and North and South Carolina, by sex and age.*

Age at nearest birthday.	Mean.		First quartile (Q <sub>1</sub> ).		Median (Md).		Third quartile (Q <sub>3</sub> ).	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
STANDING HEIGHT (INCHES).								
6.....	45.4±0.096	44.8±0.115	43.1	42.2	44.7	44.3	46.3	46.1
7.....	46.8±.064	46.6±.063	44.8	44.4	46.5	46.1	47.9	47.6
8.....	48.8±.057	48.5±.057	46.8	46.4	48.3	47.9	50.0	49.5
9.....	50.7±.060	50.5±.060	48.5	48.3	50.2	50.0	51.9	51.6
10.....	52.6±.057	52.5±.062	50.5	50.3	52.1	51.9	53.7	53.6
11.....	54.3±.064	54.5±.070	52.0	52.0	53.7	53.9	55.6	56.0
12.....	56.2±.073	57.0±.072	53.7	54.3	55.5	56.7	57.7	58.7
13.....	58.0±.076	59.3±.081	55.6	56.8	57.4	59.1	59.3	60.9
14.....	60.3±.119	61.1±.088	57.4	59.0	59.7	60.8	62.2	62.5
15.....	62.9±.156	62.5±.097	60.0	60.3	62.5	62.0	65.0	63.7
16.....	64.6±.159	63.3±.114	62.4	61.4	64.4	62.9	66.4	64.4
WEIGHT (POUNDS).								
6.....	47.5±0.269	45.5±0.261	42.4	41.0	46.8	45.0	50.7	48.6
7.....	50.4±.162	48.3±.156	46.0	44.4	49.9	47.9	54.6	51.6
8.....	54.5±.160	52.4±.171	49.8	47.8	53.9	51.7	58.9	56.4
9.....	59.6±.181	58.0±.208	53.9	52.0	58.9	56.9	64.6	63.0
10.....	65.2±.197	64.0±.238	59.5	56.7	64.7	62.3	70.4	69.6
11.....	71.1±.235	70.3±.298	64.5	62.1	70.6	68.4	76.9	76.1
12.....	78.0±.300	79.7±.353	70.0	69.3	75.7	78.2	84.4	87.3
13.....	85.1±.332	89.7±.420	76.5	78.4	84.1	88.3	92.1	99.5
14.....	95.4±.545	99.4±.433	83.9	88.2	93.6	98.4	105.5	108.8
15.....	108.4±.828	107.6±.607	95.1	96.5	107.7	106.0	122.7	117.2
16.....	116.7±.910	113.6±.740	104.9	104.4	117.6	111.9	129.9	122.6



TABLE XXII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

380 6-YEAR-OLD BOYS.

Height nearest inch.	Total num-ber of chil-dren.	Mean weight at each height.	Number of children in each 2-pound weight group.																																			
			30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65	66-67	68-69	70-71	72-73	74-75	76-77	78-79	80-81	82-83	84-85	86-87	88-89	90-91	92-93	94-95	96-97		
All heights.	380	47.5		2	3	14	15	43	38	50	46	43	44	27	19	5	7	5	3	3	2	6		2	1										1			
26																																						
27																																						
28	22	50.5								1	4	5	5	2	4					1																		
29	21	52.6							2	1			3	7	3	1	4																					
30																																						
31	6	52.5							1				1	2		2	1																					
32	3	63.0																																				
33	1	50.0											1																									
34	5	66.2																1		3				1														
35																																						
36																																						
37																																						
38																																						
39																																						
40																																						
41																																						
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60																																						
61																																						
62																																						

Constants of height and weight for 6-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $r$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	45.4	$2.77 \pm 0.068$	47.5	$7.76 \pm 0.190$	$0.830 \pm 0.0108$	$0.782 \pm 0.0134$	2.19
Girls.....	44.8	$3.21 \pm .081$	45.5	$7.27 \pm .185$	$.788 \pm .0186$	$.675 \pm .0195$	1.52

TABLE XXI.—*Mean, median, and quartile heights and weights of native white children of Maryland, Virginia, and North and South Carolina, by sex and age.*

Age at nearest birthday.	Mean.		First quartile (Q <sub>1</sub> ).		Median (Md).		Third quartile (Q <sub>3</sub> ).	
	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.	Boys.	Girls.
STANDING HEIGHT (INCHES).								
6.....	45.4±0.096	44.8±0.115	43.1	42.2	44.7	44.3	46.3	46.1
7.....	46.8±.064	46.6±.063	44.8	44.4	46.5	46.1	47.9	47.6
8.....	48.8±.057	48.5±.057	46.8	46.4	48.3	47.9	50.0	49.5
9.....	50.7±.060	50.5±.060	48.5	48.3	50.2	50.0	51.9	51.6
10.....	52.6±.057	52.5±.062	50.5	50.3	52.1	51.9	53.7	53.6
11.....	54.3±.064	54.5±.070	52.0	52.0	53.7	53.9	55.6	56.0
12.....	56.2±.073	57.0±.072	53.7	54.3	55.5	56.7	57.7	58.7
13.....	58.0±.076	59.3±.081	55.6	56.8	57.4	59.1	59.3	60.9
14.....	60.3±.119	61.1±.088	57.4	59.0	59.7	60.8	62.2	62.5
15.....	62.9±.156	62.5±.097	60.0	60.3	62.5	62.0	65.0	63.7
16.....	64.6±.159	63.3±.114	62.4	61.4	64.4	62.9	66.4	64.4
WEIGHT (POUNDS).								
6.....	47.5±0.269	45.5±0.261	42.4	41.0	46.8	45.0	50.7	48.6
7.....	50.4±.162	48.3±.156	46.0	44.4	49.9	47.9	54.6	51.6
8.....	54.5±.160	52.4±.171	49.8	47.8	53.9	51.7	58.9	56.4
9.....	59.6±.181	58.0±.208	53.9	52.0	58.9	56.9	64.6	63.0
10.....	65.2±.197	64.0±.238	59.5	56.7	64.7	62.3	70.4	69.6
11.....	71.1±.235	70.3±.298	64.5	62.1	70.6	68.4	76.9	76.1
12.....	78.0±.300	79.7±.353	70.0	69.3	75.7	78.2	84.4	87.3
13.....	85.1±.332	89.7±.420	76.5	78.4	84.1	88.3	92.1	99.5
14.....	95.4±.545	99.4±.433	83.9	88.2	93.6	98.4	105.5	108.8
15.....	108.4±.828	107.6±.607	95.1	96.5	107.7	106.0	122.7	117.2
16.....	116.7±.910	113.6±.740	104.9	104.4	117.6	111.9	129.9	122.6

TABLE XXII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

## 350 6-YEAR-OLD BOYS.

Height nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65
All heights.	380	47.5		2	3	14	15	43	38	50	46	43	44	27	19	5	7	5	3	3
26																				
27																				
28																				
29																				
30																				
31																				
32																				
33																				
34																				
35																				
36																				
37																				
38																				
39	3	50.0			1	2														
40	5	43.0											1							
41	17	39.4																		
42	26	40.2		1	1															
43	36	43.1																		
44	60	45.1																		
45	65	45.7																		
46	60	47.6																		
47	38	49.8																		
48	30	52.6																		
49	15	55.9																		
50	9	50.8																		
51	7	65.9																		
52	3	70.7																		
53	3	70.3																		
54	1	69.0																		
55																				
56	1	50.9																		
57																				
58																				
59																				
60																				
61																				
62	1	93.0																		

## 353 6-YEAR-OLD GIRLS.

Height nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65
All heights.	353	45.5	1	4	11	21	24	38	37	63	47	29	28	15	10	6	7	2	2	4
26																				
27																				
28																				
29																				
30																				
31																				
32																				
33																				
34																				
35																				
36																				
37	1	37.0																		
38	1	49.0																		
39	7	30.0																		
40	12	36.3																		
41	17	41.8																		
42	41	40.2																		
43	29	42.0																		
44	47	45.4																		
45	53	45.3																		
46	48	46.1																		
47	35	49.2																		
48	22	50.5																		
49	21	52.6																		
50	6	52.5																		
51	3	63.0																		
52	1	50.0																		
53	5	65.2																		
54																				
55																				
56	1	96.0																		
57																				
58																				
59																				
60																				
61																				
62																				

Constants of height and weight for 6-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	45.4	2.77 ± 0.068	47.5	7.76 ± 0.190	0.830 ± 0.0108	0.782 ± 0.0134	2.19
Girls.....	44.8	3.21 ± .081	45.5	7.27 ± .185	.788 ± .0136	.675 ± .0135	1.52



TABLE XXIII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.  
745 7-YEAR-OLD BOYS.

Height nearest inch.	Total number of children.	Mean weight of each height.	Number of children in each 2-pound weight group.																														
			34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65	66-67	68-69	70-71	72-73	74-75	76-77	78-79	80-81	82-83	84-85	86-87	88-89	90-91		
All heights.	745	50.4	1	7	8	29	49	73	89	91	112	81	60	50	32	24	13	13	4	4	2						1		1				
31	1	57.0												1																			
53	5	63.8												1		1	1	1								1							
54	5	58.6				1																											
55	1	75.0																						1									
56																																	
57																																	
58																																	
59																																	
60	1	61.0														1																	
61																																	

Constants of height and weight for 7-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	46.8	2.58±0.045	50.4	6.56±0.115	0.704±0.0125	0.603±0.0157	1.53
Girls.....	46.6	2.53±0.044	48.3	6.26±0.110	.725±.0118	.679±.0134	1.68



TABLE XXIII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

## 745 7-YEAR-OLD BOYS.

Height nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65	66-67	68-69
All heights.	745	50.4	1	7	8	29	49	73	89	91	112	81	60	50	32	24	13	13	4	4
31	1	57.0												1						
32																				
33																				
34																				
35	1	60.0																		
36	1	48.0																		
37	2	61.5																		
38																				
39																				
40	8	39.9		2	1	3		1	1											
41	1	37.0		1																
42	13	42.3		1			6	1	2											
43	18	42.7		1	3		10	3	10											
44	61	45.2		1			10	10	16											
45	101	46.0			3		15	26	16											
46	104	47.9					9	15	24											
47	128	50.7					6	11	11											
48	127	51.6					1	4	12											
49	82	55.1	1					1	3											
50	42	57.5																		
51	29	58.0																		
52	16	59.9																		
53	5	58.6																		
54	1	56.0																		
55	3	61.7						1												
56																				
57																				
58																				
59	1	53.0																		
60																				
61																				

## 735 7-YEAR-OLD GIRLS.

Height nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65	66-67	68-69
All heights.	735	48.3	3	10	21	58	60	90	103	103	93	60	39	22	18	19	6	8		
31																				
32																				
33																				
34																				
35	1	56.0																		
36																				
37	2	47.0																		
38																				
39																				
40	1	36.0		1																
41	6	40.3		1																
42	24	42.1		2	3	8														
43	42	41.6		3	6	11														
44	62	44.0	2	1	6	9														
45	101	44.5		3	4	15														
46	122	46.8				12														
47	129	48.8				15														
48	99	50.8				21														
49	69	53.2				3														
50	36	55.4				1														
51	20	56.2				1														
52	9	58.7				1														
53	5	63.8																		
54	5	58.6																		
55	1	75.0																		
56																				
57																				
58																				
59																				
60	1	61.0																		
61																				

Constants of height and weight for 7-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (%).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	46.8	2.58±0.045	50.4	6.56±0.115	0.704±0.0125	0.603±0.0137	1.33
Girls.....	46.6	2.53±0.044	48.3	6.26±0.110	.723±.0115	.679±.0134	1.68

TABLE XXIII.—Correlation between height and measure of urinary vitamin A excretion in healthy children in Washington, D.C., 1950-1951

[illegible]



TABLE XXIV.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*  
904 8-YEAR-OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																																			
			26-27	28-29	30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61	62-63	64-65	66-67	68-69	70-71	72-73	74-75	76-77	78-79	80-81	82-83	84-85	86-87	88-89	90-91	92-93	94-95	
All heights.	904	54.5					2	3	10	15	39	61	80	129	100	112	83	68	70	38	43	13	10	6	6	7	3	1	2	2							1	
38																																						
														</																								

Constants of height and weight for 8-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $\eta$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	48.8	2.54 $\pm$ .040	54.5	7.13 $\pm$ 0.113	0.718 $\pm$ 0.0109	0.682 $\pm$ 0.0120	1.91
Girls.....	48.5	2.47 $\pm$ .040	52.4	7.39 $\pm$ .121	.751 $\pm$ .0101	.719 $\pm$ .0111	2.15



TABLE XXIV.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

904 8-YEAR-OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			26-27	28-29	30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61
All heights.	904	54.5						2	3	10	15	39	61	80	129	100	112	83	68	70
38																				
39																				
40	1	52.0																		
41	2	51.0																		
42	6	49.3																		
43	7	44.7																		
44	18	47.4																		
45	41	47.6																		
46	68	48.0																		
47	112	50.3																		
48	197	52.2																		
49	154	54.7																		
50	113	56.8																		
51	101	57.9																		
52	60	61.2																		
53	34	64.6																		
54	15	66.8																		
55	8	74.0																		
56	2	62.0																		
57	2	60.5																		
58	2	72.0																		
59	1	58.0																		

854 8-YEAR-OLD GIRLS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 2-pound weight group.																	
			26-27	28-29	30-31	32-33	34-35	36-37	38-39	40-41	42-43	44-45	46-47	48-49	50-51	52-53	54-55	56-57	58-59	60-61
All heights.	854	52.4	1			1	2		6	32	29	61	72	95	122	96	92	60	53	47
38																				
39	1	55.0																		
40																				
41	2	45.0																		
42	1	33.0																		
43	11	41.4																		
44	23	42.8																		
45	42	44.6																		
46	87	46.8																		
47	123	49.4																		
48	163	51.0																		
49	136	53.2																		
50	96	56.0																		
51	69	57.5																		
52	33	61.1																		
53	29	60.7																		
54	9	63.2																		
55	3	78.3																		
56	3	59.3																		
57																				
58	2	88.5																		
59	1	80.0																		

Constants of height and weight for 8-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	48.8	2.54±0.040	54.5	7.13±0.113	0.718±0.0109	0.682±0.0120	1.91
Girls.....	48.5	2.47±0.040	52.4	7.39±0.121	.751±.0101	.719±.0111	2.15

Height, nearest 1/4	Number of chil-	Weight of each child	Total Weight
15-16	1	24.2	24.2
16-17	1	25.0	25.0
17-18	1	25.0	25.0
18-19	1	25.0	25.0
19-20	1	25.0	25.0
20-21	1	25.0	25.0
21-22	1	25.0	25.0
22-23	1	25.0	25.0
23-24	1	25.0	25.0
24-25	1	25.0	25.0
25-26	1	25.0	25.0
26-27	1	25.0	25.0
27-28	1	25.0	25.0
28-29	1	25.0	25.0
29-30	1	25.0	25.0
30-31	1	25.0	25.0
31-32	1	25.0	25.0
32-33	1	25.0	25.0
33-34	1	25.0	25.0
34-35	1	25.0	25.0
35-36	1	25.0	25.0
36-37	1	25.0	25.0
37-38	1	25.0	25.0
38-39	1	25.0	25.0
39-40	1	25.0	25.0
40-41	1	25.0	25.0
41-42	1	25.0	25.0
42-43	1	25.0	25.0
43-44	1	25.0	25.0
44-45	1	25.0	25.0
45-46	1	25.0	25.0
46-47	1	25.0	25.0
47-48	1	25.0	25.0
48-49	1	25.0	25.0
49-50	1	25.0	25.0
50-51	1	25.0	25.0
51-52	1	25.0	25.0
52-53	1	25.0	25.0
53-54	1	25.0	25.0
54-55	1	25.0	25.0
55-56	1	25.0	25.0
56-57	1	25.0	25.0
57-58	1	25.0	25.0
58-59	1	25.0	25.0
59-60	1	25.0	25.0
60-61	1	25.0	25.0
61-62	1	25.0	25.0
62-63	1	25.0	25.0
63-64	1	25.0	25.0
64-65	1	25.0	25.0
65-66	1	25.0	25.0
66-67	1	25.0	25.0
67-68	1	25.0	25.0
68-69	1	25.0	25.0
69-70	1	25.0	25.0
70-71	1	25.0	25.0
71-72	1	25.0	25.0
72-73	1	25.0	25.0
73-74	1	25.0	25.0
74-75	1	25.0	25.0
75-76	1	25.0	25.0
76-77	1	25.0	25.0
77-78	1	25.0	25.0
78-79	1	25.0	25.0
79-80	1	25.0	25.0
80-81	1	25.0	25.0
81-82	1	25.0	25.0
82-83	1	25.0	25.0
83-84	1	25.0	25.0
84-85	1	25.0	25.0
85-86	1	25.0	25.0
86-87	1	25.0	25.0
87-88	1	25.0	25.0
88-89	1	25.0	25.0
89-90	1	25.0	25.0
90-91	1	25.0	25.0
91-92	1	25.0	25.0
92-93	1	25.0	25.0
93-94	1	25.0	25.0
94-95	1	25.0	25.0
95-96	1	25.0	25.0
96-97	1	25.0	25.0
97-98	1	25.0	25.0
98-99	1	25.0	25.0
99-100	1	25.0	25.0
100-101	1	25.0	25.0
101-102	1	25.0	25.0
102-103	1	25.0	25.0
103-104	1	25.0	25.0
104-			

**Империята на евреите**

804 8-1.EV8-OTD BOX22-

THE STATE OF NEW YORK.—VILLAGE OF ALBANY.—SCHOOL DISTRICT NO. 1, ALBANY, NORTH CAROLINA, AND ZION CAROLINA.

TABLE XXV.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

889 9-YEAR-OLD BOYS.

Total number of children.			Mean weight at each height.	Number of children in each 3-pound weight group.																									
Height, nearest inch.	All heights.	889		59.6	35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88	89-91	92-94	95-97	98-100	101-103	104-106	
50	138	55.9					1	6	30	37	22	19	13	3		3	2	1			1								
51	154	58.6						3	16	37	25	34	12	15	8		2						1						
52	122	62.0							5	10	19	31	24	13	9	5	3	1	1							1			
53	72	64.3							1	7	7	12	12	10	14	5	1	1	1			2							
54	51	66.0							1	3	1	10	6	9	8	6	4		1										
55	26	71.0										1	6	4	4	4	2	1	2				1						
56	13	74.8												3	4		2				1		1						
57	6	79.8												1		1	1					1							
58	5	83.2																			2								
59	2	85.0																											
60	1	86.0																											
61																													
62																													
63	1	105.0																				1							1

Constants of height and weight for 9-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $r$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	50.7	2.66±0.043	59.6	7.98±0.128	0.744±0.0101	0.643±0.0133	1.92
Girls.....	50.5	2.69±.043	58.0	9.24±.147	.724±.0107	.661±.0127	2.27

TABLE XXV.—CONVERSION BETWEEN HEIGHTS AND WEIGHTS OF AMERICANS WHOSE HEIGHTS ARE MEASURED IN INCHES, POUNDS, KILOGRAMS, METERS, AND CENTIMETERS.

804 2-X-EV-OLD BOX 2

Height inches	Height meters	Weight pounds	Weight kilograms	Number of children in each 5-pound weight group	Number of children in each 5-pound weight group
50	1.27	100	45.4	1	1
51	1.29	100	45.4	1	1
52	1.31	100	45.4	1	1
53	1.34	100	45.4	1	1
54	1.37	100	45.4	1	1
55	1.39	100	45.4	1	1
56	1.42	100	45.4	1	1
57	1.44	100	45.4	1	1
58	1.47	100	45.4	1	1
59	1.49	100	45.4	1	1
60	1.52	100	45.4	1	1
61	1.54	100	45.4	1	1
62	1.57	100	45.4	1	1
63	1.59	100	45.4	1	1
64	1.62	100	45.4	1	1
65	1.64	100	45.4	1	1
66	1.67	100	45.4	1	1
67	1.69	100	45.4	1	1
68	1.72	100	45.4	1	1
69	1.74	100	45.4	1	1
70	1.77	100	45.4	1	1
71	1.79	100	45.4	1	1
72	1.82	100	45.4	1	1
73	1.84	100	45.4	1	1
74	1.87	100	45.4	1	1
75	1.89	100	45.4	1	1
76	1.92	100	45.4	1	1
77	1.94	100	45.4	1	1
78	1.96	100	45.4	1	1
79	1.99	100	45.4	1	1
80	2.01	100	45.4	1	1
81	2.04	100	45.4	1	1
82	2.06	100	45.4	1	1
83	2.09	100	45.4	1	1
84	2.11	100	45.4	1	1
85	2.14	100	45.4	1	1
86	2.16	100	45.4	1	1
87	2.19	100	45.4	1	1
88	2.21	100	45.4	1	1
89	2.24	100	45.4	1	1
90	2.26	100	45.4	1	1
91	2.29	100	45.4	1	1
92	2.31	100	45.4	1	1
93	2.34	100	45.4	1	1
94	2.36	100	45.4	1	1
95	2.39	100	45.4	1	1
96	2.41	100	45.4	1	1
97	2.44	100	45.4	1	1
98	2.46	100	45.4	1	1
99	2.49	100	45.4	1	1
100	2.51	100	45.4	1	1

TABLE XXV.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

889 9-YEAR-OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 3-pound weight group.																	
			35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88
All heights.	889	59.6		1	1	18	39	117	129	129	120	112	93	56	29	26	4	5	3	2
28	1	63.0										1								
29																				
30																				
31																				
32																				
33																				
34																				
35	1	48.0					1													
36	1	65.0											1							
37																				
38																				
39																				
40	1	61.0																		
41	1	63.0										1								
42																				
43	1	44.0				1														
44																				
45	8	46.5		1																
46	18	49.0																		
47	43	52.1			1															
48	83	52.8																		
49	120	54.3																		
50	137	57.2																		
51	140	59.9																		
52	127	62.5																		
53	95	63.4																		
54	63	68.2																		
55	31	71.7																		
56	9	75.2																		
57	5	71.4																		
58	1	89.0																		
59	1	55.0																		
60		74.0																		
61																				
62	1	59.0																		
63																				

900 9-YEAR-OLD GIRLS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 3-pound weight group.																	
			35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88
All heights.	900	58.0	1	1	18	42	69	122	151	107	127	78	62	52	26	15	5	7	4	3
28																				
29																				
30																				
31																				
32																				
33																				
34																				
35																				
36																				
37																				
38																				
39																				
40	1	80.0																		
41	2	59.5																		
42																				
43																				
44	3	45.0																		
45	9	47.9																		
46	30	47.0																		
47	30	49.5																		
48	91	51.2																		
49	116	54.1																		
50	138	55.9																		
51	134	58.6																		
52	122	62.0																		
53	72	64.3																		
54	51	66.0																		
55	26	71.0																		
56	13	74.8																		
57	6	79.8																		
58	5	68.2																		
59	2	85.0																		
60	1	86.0																		
61																				
62																				
63	1	105.0																		

Constants of height and weight for 9-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	50.7	2.66±0.043	59.6	7.98±0.128	0.744±0.0101	0.643±0.0133	1.92
Girls.....	50.5	2.69±.043	58.0	9.24±.147	.724±.0107	.661±.0127	2.27

[illegible]



TABLE XXVI.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*

973.—10-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 3-pound weight group.																																	
			35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88	89-91	92-94	95-97	98-100	101-103	104-106	107-109	110-112	113-115	116-118	119-121	122-124	125-127	128-130		
All heights.	973	65.2	1			8	13	47	59	86	127	143	128	128	63	73	33	27	14	8	5	4	4	1			1									
35	1	65.0																																		
37	9	65.9											1	1	2	3	2	2	3	1			1	1	1									1		
53	22	85.5						1			1	1	1	1	1	2	1	2	4	1	2	1	1	2	1	1	1	1								
59	5	75.6																																		
60	6	93.7														1				2	1		1			1										
61	1	96.0															1																			
62	1	76.0												1		1																				
63	1	66.0																																		
64																																				
65	1	94.0																																		
66																																				

Constants of height and weight for 10-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $r$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	52.6	2.64±0.040	65.2	9.09±0.139	0.720±0.0104	0.693±0.0113	2.38
Girls.....	52.5	2.83±.044	64.0	10.79±.168	.709±.0110	.660±.0125	2.52

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initiated during 2000. Further, the results indicate that the impact of the intervention was significant in the short term, but not in the long term.

TABLE XXVI.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

973.—10-YEAR OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 3-pound weight group.																	
			35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88
All heights.	973	65.2	1			8	13	47	59	86	127	143	128	128	63	73	33	27	14	8
35	1	65.0											1							
36																				
37																				
38																				
39																				
40	1	37.0	1																	
41																				
42																				
43	1	45.0				1														
44																				
45	2	45.0				3														
46	9	50.2				2														
47	13	51.6				1														
48	29	55.1				3														
49	44	55.4				4														
50	78	58.4				1														
51	140	60.7				11														
52	156	64.0				12														
53	154	66.5				15														
54	141	68.2				17														
55	90	71.6				16														
56	58	74.5				12														
57	31	77.9				10														
58	9	79.7				8														
59	7	81.4				6														
60	5	79.0				5														
61	1	95.0				4														
62	2	72.5				3														
63						2														
64						2														
65						1														
66						1														

936 10-YEAR OLD GIRLS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 3-pound weight group.																	
			35-37	38-40	41-43	44-46	47-49	50-52	53-55	56-58	59-61	62-64	65-67	68-70	71-73	74-76	77-79	80-82	83-85	86-88
All heights.	936	64.6	1	5	11	18	57	100	107	136	107	104	91	51	61	16	11	21	12	5
35	1	50.0																		
36																				
37																				
38																				
39																				
40	2	53.5																		
41																				
42																				
43	3	61.3																		
44																				
45	4	60.8																		
46	8	65.8																		
47	11	68.8																		
48	35	72.7																		
49	50	74.7																		
50	79	77.0																		
51	140	82.5																		
52	162	86.1																		
53	136	83.6																		
54	115	86.5																		
55	66	90.0																		
56	55	93.9																		
57	32	95.4																		
58	22	98.5																		
59	5	75.6																		
60	6	93.7																		
61	1	96.0																		
62	1	76.0																		
63	1	66.0																		
64																				
65																				
66	1	94.0																		

Constants of height and weight for 10-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	52.6	2.64±0.040	65.2	9.09±0.139	0.720±0.0104	0.693±0.0113	2.38
Girls.....	52.5	2.83±.044	64.0	10.79±.168	.709±.0110	.660±.0125	2.52



TABLE XXVII.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*

871 11-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 4-pound weight group.																																		
			40-43	44-47	48-51	52-55	56-59	60-63	64-67	68-71	72-75	76-79	80-83	84-87	88-91	92-95	96-99	100-103	104-107	108-111	112-115	116-119	120-123	124-127	128-131	132-135	136-139	140-143	144-147	148-151	152-155	156-159	160-163	164-167	168-171		
All heights.	871	71.1		9	6	26	43	105	149	127	155	95	59	41	22	13	8	4	4		1	1	1														
76	88	72.2																																			
77	90	73.0																																			
78	52	81.2			1																																
79	32	84.6																																			
80	23	93.3																																			
81	3	94.8																																			
82	4	100.3																																			
83	2	90.0																																			
84	2	72.0																																			
85	3	83.7			1																																

Constants of height and weight for 11-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $r$ ).	Coefficient of correlation ( $r$ ).	Regres- sion of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	54.3	2.82±0.046	71.1	10.30±0.166	0.726±0.0108	0.657±0.0130	2.41
Girls.....	54.5	3.00±.049	70.3	12.87±.211	.695±.0120	.647±.0135	2.79

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TABLE XXVII.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*

871 11-YEAR OLD BOYS.

[illegible]

847 11-YEAR OLD GIRLS.

[illegible]

#### Constants of height and weight for 11-year-old children

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $\gamma$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys	54.3	2.82 $\pm$ 0.046	71.3	10.30 $\pm$ 0.166	0.726 $\pm$ 0.0108	0.657 $\pm$ 0.0130	2.49
Girls	54.5	3.00 $\pm$ .049	70.1	12.57 $\pm$ .211	-.095 $\pm$ .0120	-.647 $\pm$ .0135	2.71









TABLE XXVIII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

## 781 12-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																								
			40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154		
All heights.	781	78.0			4	12	54	108	100	130	115	69	51	30	17	4	7	4	4	3	2	1					
44	1	70.0							1																		
45	2	55.5			1	1																					
46	1	79.0								1																	
47																											
48	3	61.7		1	1				1																		
49																											
50	6	61.8		1	1	2	2	1	2	8	6	1	1		1												
51	20	65.4		1	5	2	8	13	15	18	18	6	1														
52	41	66.4			2	10	16	7	27	36	11	5	2	1													
53	62	68.1			1	7	16	4	4	12	2	11															
54	89	70.8		1								2															
55	108	73.1				6	23	37	26	30	8	22	6	2													
56	112	77.6					15	25	30	22	13	13	4	2													
57	87	79.8					3	16	29	21	10	10	3	2													
58	77	81.8					1	4	9	15	22	13	7	4													
59	71	87.0								12	21	7	13	4													
60	33	87.5							3	2	5	7	10	4	5	6	1	1									
61	36	92.8											4	2	10	5	1	1									
62	16	100.3													4	4											
63	6	105.2													1	1		2	1								
64	4	106.5																2	1								
65	3	118.7																1	1								
66	1	115.0																									
67	1	96.0													1												
68																											
69	1	90.0																									

## 805 12-YEAR OLD GIRLS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																								
			40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154		
All heights.	805	79.7	2	1	8	22	63	110	116	117	92	107	50	44	24	13	13	11	4	3	1	1	1	1	1		
44																											
45																											
46	1	44.0	1																								
47	1	56.0				1																					
48																											
49	2	62.5		1					1																		
50	9	66.0	1	1	1	2	3	1	1	1	1	2															
51	13	62.6				3	8	1	1	1	1	1															
52	27	61.7				6	12	11	10	7	2	3	1														
53	40	67.5				4	12	11	11	7	2	3	1														
54	83	69.0				3	18	27	19	27	8	4	4														
55	83	71.1				3	11	24	24	7	7	6	1	1													
56	83	74.5					4	18	21	22	9	5	1	2													
57	95	79.4					3	8	21	19	18	16	4	1	1												
58	101	82.4					3	8	16	22	14	16	9	6	2												
59	100	87.0					2	2	21	18	26	9	13	3	2	2	2	1		1							
60	74	89.5					1	1	2	13	11	16	7	10	6	5	3	3									
61	41	93.6							1	2	4	7	9	7	2	2	1	2									
62	29	99.4											3	3	3	2	2	2									
63	14	100.2						1					1	1	1	2	1	1									
64	5	107.6																									
65	2	113.5																									
66	1	120.0																									
67		122.0																									
68																											
69																											

Constants of height and weight for 12-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regres- sion of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	56.2	3.03±0.052	78.0	12.43±0.212	0.736±0.0111	0.706±0.0121	2.91
Girls.....	57.0	3.02±.051	78.7	14.85±.250	.719±.015	.703±.0120	3.44

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Number of children in each 2-hourly height group.

Height inches	Weight pounds	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	24-25	25-26	26-27	27-28	28-29	29-30	30-31	31-32	32-33	33-34	34-35	35-36	36-37	37-38	38-39	39-40	40-41	41-42	42-43	43-44	44-45	45-46	46-47	47-48	48-49	49-50	50-51	51-52	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62	62-63	63-64	64-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	72-73	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85	85-86	86-87	87-88	88-89	89-90	90-91	91-92	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-100	100-101	101-102	102-103	103-104	104-105	105-106	106-107	107-108	108-109	109-110	110-111	111-112	112-113	113-114	114-115	115-116	116-117	117-118	118-119	119-120	120-121	121-122	122-123	123-124	124-125	125-126	126-127	127-128	128-129	129-130	130-131	131-132	132-133	133-134	134-135	135-136	136-137	137-138	138-139	139-140	140-141	141-142	142-143	143-144	144-145	145-146	146-147	147-148	148-149	149-150	150-151	151-152	152-153	153-154	154-155	155-156	156-157	157-158	158-159	159-160	160-161	161-162	162-163	163-164	164-165	165-166	166-167	167-168	168-169	169-170	170-171	171-172	172-173	173-174	174-175	175-176	176-177	177-178	178-179	179-180	180-181	181-182	182-183	183-184	184-185	185-186	186-187	187-188	188-189	189-190	190-191	191-192	192-193	193-194	194-195	195-196	196-197	197-198	198-199	199-200	200-201	201-202	202-203	203-204	204-205	205-206	206-207	207-208	208-209	209-210	210-211	211-212	212-213	213-214	214-215	215-216	216-217	217-218	218-219	219-220	220-221	221-222	222-223	223-224	224-225	225-226	226-227	227-228	228-229	229-230	230-231	231-232	232-233	233-234	234-235	235-236	236-237	237-238	238-239	239-240	240-241	241-242	242-243	243-244	244-245	245-246	246-247	247-248	248-249	249-250	250-251	251-252	252-253	253-254	254-255	255-256	256-257	257-258	258-259	259-260	260-261	261-262	262-263	263-264	264-265	265-266	266-267	267-268	268-269	269-270	270-271	271-272	272-273	273-274	274-275	275-276	276-277	277-278	278-279	279-280	280-281	281-282	282-283	283-284	284-285	285-286	286-287	287-288	288-289	289-290	290-291	291-292	292-293	293-294	294-295	295-296	296-297	297-298	298-299	299-300	300-301	301-302	302-303	303-304	304-305	305-306	306-307	307-308	308-309	309-310	310-311	311-312	312-313	313-314	314-315	315-316	316-317	317-318	318-319	319-320	320-321	321-322	322-323	323-324	324-325	325-326	326-327	327-328	328-329	329-330	330-331	331-332	332-333	333-334	334-335	335-336	336-337	337-338	338-339	339-340	340-341	341-342	342-343	343-344	344-345	345-346	346-347	347-348	348-349	349-350	350-351	351-352	352-353	353-354	354-355	355-356	356-357	357-358	358-359	359-360	360-361	361-362	362-363	363-364	364-365	365-366	366-367	367-368	368-369	369-370	370-371	371-372	372-373	373-374	374-375	375-376	376-377	377-378	378-379	379-380	380-381	381-382	382-383	383-384	384-385	385-386	386-387	387-388	388-389	389-390	390-391	391-392	392-393	393-394	394-395	395-396	396-397	397-398	398-399	399-400	400-401	401-402	402-403	403-404	404-405	405-406	406-407	407-408	408-409	409-410	410-411	411-412	412-413	413-414	414-415	415-416	416-417	417-418	418-419	419-420	420-421	421-422	422-423	423-424	424-425	425-426	426-427	427-428	428-429	429-430	430-431	431-432	432-433	433-434	434-435	435-436	436-437	437-438	438-439	439-440	440-441	441-442	442-443	443-444	444-445	445-446	446-447	447-448	448-449	449-450	450-451	451-452	452-453	453-454	454-455	455-456	456-457	457-458	458-459	459-460	460-461	461-462	462-463	463-464	464-465	465-466	466-467	467-468	468-469	469-470	470-471	471-472	472-473	473-474	474-475	475-476	476-477	477-478	478-479	479-480	480-481	481-482	482-483	483-484	484-485	485-486	486-487	487-488	488-489	489-490	490-491	491-492	492-493	493-494	494-495	495-496	496-497	497-498	498-499	499-500	500-501	501-502	502-503	503-504	504-505	505-506	506-507	507-508	508-509	509-510	510-511	511-512	512-513	513-514	514-515	515-516	516-517	517-518	518-519	519-520	520-521	521-522	522-523	523-524	524-525	525-526	526-527	527-528	528-529	529-530	530-531	531-532	532-533	533-534	534-535	535-536	536-537	537-538	538-539	539-540	540-541	541-542	542-543	543-544	544-545	545-546	546-547	547-548	548-549	549-550	550-551	551-552	552-553	553-554	554-555	555-556	556-557	557-558	558-559	559-560	560-561	561-562	562-563	563-564	564-565	565-566	566-567	567-568	568-569	569-570	570-571	571-572	572-573	573-574	574-575	575-576	576-577	577-578	578-579	579-580	580-581	581-582	582-583	583-584	584-585	585-586	586-587	587-588	588-589	589-590	590-591	591-592	592-593	593-594	594-595	595-596	596-597	597-598	598-599	599-600	600-601	601-602	602-603	603-604	604-605	605-606	606-607	607-608	608-609	609-610	610-611	611-612	612-613	613-614	614-615	615-616	616-617	617-618	618-619	619-620	620-621	621-622	622-623	623-624	624-625	625-626	626-627	627-628	628-629	629-630	630-631	631-632	632-633	633-634	634-635	635-636	636-637	637-638	638-639	639-640	640-641	641-642	642-643	643-644	644-645	645-646	646-647	647-648	648-649	649-650	650-651	651-652	652-653	653-654	654-655	655-656	656-657	657-658	658-659	659-660	660-661	661-662	662-663	663-664	664-665	665-666	666-667	667-668	668-669	669-670	670-671	671-672	672-673	673-674	674-675	675-676	676-677	677-678	678-679	679-680	680-681	681-682	682-683	683-684	684-685	685-686	686-687	687-688	688-689	689-690	690-691	691-692	692-693	693-694	694-695	695-696	696-697	697-698	698-699	699-700	700-701	701-702	702-703	703-704	704-705	705-706	706-707	707-708	708-709	709-710	710-711	711-712	712-713	713-714	714-715	715-716	716-717	717-718	718-719	719-720	720-721	721-722	722-723	723-724	724-725	725-726	726-727	727-728	728-729	729-730	730-731	731-732	732-733	733-734	734-735	735-736	736-737	737-738	738-739	739-740	740-741	741-742	742-743	743-744	744-745	745-746	746-747	747-748	748-749	749-750	750-751	751-752	752-753	753-754	754-755	755-756	756-757	757-758	758-759	759-760	760-761	761-762	762-763	763-764	764-765	765-766	766-767	767-768	768-769	769-770	770-771	771-772	772-773	773-774	774-775	775-776	776-777	777-778	778-779	779-780	780-781	781-782	782-783	783-784	784-785	785-786	786-787	787-788	788-789	789-790	790-791	791-792	792-793	793-794	794-795	795-796	796-797	797-798	798-799	799-800	800-801	801-802	802-803	803-804	804-805	805-806	806-807	807-808	808-809	809-810	810-811	811-812	812-813	813-814	814-815	815-816	816-817	817-818	818-819	819-820	820-821	821-822	822-823	823-824	824-825	825-826	826-827	827-828	828-829	829-830	830-831	831-832	832-833	833-834	834-835	835-836	836-837	837-838	838-839	839-840	840-841	841-842	842-843	843-844	844-845	845-846	846-847	847-848	848-849	849-850	850-851	851-852	852-853	853-854	854-855	855-856	856-857	857-858	858-859	859-860	860-861	861-862	862-863	863-864	864-865	865-866	866-867	867-868	868-869	869-870	870-871	871-872	872-873	873-874	874-875	875-876	876-877	877-878	878-879	879-880	880-881	881-882	882-883	883-884	884-885	885-886	886-887	887-888	888-889	889-890	890-891	891-892	892-893	893-894	894-895	895-896	896-897	897-898	898-899	899-900	900-901	901-902	902-903	903-904	904-905	905-906	906-907	907-908	908-909	909-910	910-911	911-912	912-913	913-914	914-915	915-916	916-917	917-918	918-919	919-920	920-921	921-922	922-923	923-924	924-925	925-926	926-927	927-928	928-929	929-930	930-931	931-932	932-933	933-934	934-935	935-936	936-937	937-938	938-939	939-940	940-941	941-942	942-943	943-944	944-945	945-946	946-947	947-948	948-949	949-950	950-951	951-952	952-953	953-954	954-955	955-956	956-957	957-958	958-959	959-960	960-961	961-962	962-963	963-964	964-965	965-966	966-967	967-968	968-969	969-970	970-971	971-972	972-973	973-974	974-975	975-976	976-977	977-978	978-979	979-980	980-981	981-982	982-983	983-984	984-985	985-986	986-987	987-988	988-989	989-990	990-991	991-992	992-993	993-994	994-995	995-996	996-997	997-998	998-999	999-1000	1000-1001	1001-1002	1002-1003	1003-1004	1004-1005	1005-1006	1006-1007	1007-1008	1008-1009	1009-1010	1010-1011	1011-1012	1012-1013	1013-1014	1014-1015	1015-1016	1016-1017	1017-1018	1018-1019	1019-1020	1020-1021	1021-1022	1022-1023	1023-1024	1024-1025	1025-1026	1026-1027	1027-1028	1028-1029	1029-1030	1030-1031	1031-1032	1032-1033	1033-1034	
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TABLE XXIX.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*

679 13-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																							
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154		
All heights.	679	85.1	1	1	3	21	33	62	113	116	116	72	47	35	29	12	10	6	1	1						
45	1	81.0						1																		
68	1	74.0																								
69	2	95.0										1		1												
70																										

Constants of height and weight for 13-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $\eta$ ).	Coefficient of correlation ( $r$ ).	Regres- sion of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	58.0	2.93±0.054	85.1	12.84±0.235	0.720±0.0125	0.687±0.0137	3.02
Girls.....	59.3	3.16±.057	89.7	16.41±.297	.707±.0128	.669±.0141	3.48

109764\*—22. (Face p. 36.) No. 8



TABLE XXIX.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

679 13-YEAR OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.															
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124
All heights.	679	85.1	1	1	3	21	33	62	113	116	116	72	47	35	29	12	10	6
45	1	81.0								1								
46																		
47																		
48		87.0																
49																		
50	5	77.0				1	1		1									
51	3	67.0				2	2		1									
52	11	65.9	1	1		6	3		1									
53	17	67.4				5	7		2	3								
54	26	73.7				7	7		5	1				1				
55	53	74.8				3	16	17	19	4				1				
56	85	78.4			1	7	19	28	24	14				1				
57	101	82.1	1			4	9	27	27	19				5				
58	101	84.0				1	6	22	28	26				3				
59	82	87.4					1	9	21	24				3				
60	73	91.2						2	11	19				9				
61	39	94.8						1	1	4				6				
62	35	98.1							1	3				5				
63	26	104.3								2				4				
64	11	101.2								1				3				
65	6	113.3												2				
66														1				
67	1	123.0																
68																		
69	1	100.0												1				
70	1	115.0																

695 13-YEAR OLD GIRLS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.															
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124
All heights.	695	89.7	1	3	7	24	27	44	85	88	85	73	86	57	40	20	18	17
45																		
46																		
47																		
48																		
49																		
50	4	86.5	1											1	2			
51	2	63.0												1				
52	10	66.4																
53	10	74.8																
54	25	69.4																
55	35	70.5																
56	39	76.3																
57	64	81.4																
58	68	83.9																
59	86	86.9																
60	86	92.0																
61	106	96.5																
62	58	109.4																
63	45	104.4																
64	28	105.6																
65	18	113.8																
66	7	115.7																
67	2	125.0																
68	1	74.0																
69	2	95.0																
70																		

Constants of height and weight for 13-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	58.0	2.93±0.054	85.1	12.84±0.235	0.720±0.0125	0.687±0.0137	3.02
Girls.....	59.3	3.16±0.057	89.7	16.41±0.297	.707±0.0128	.669±0.0141	3.48





TABLE XXX.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

## 471 14-YEAR OLD BOYS.

Height, nearest mch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																													
			30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169		
All heights.	471	95.4	1	1	.....	.....	.....	5	12	22	33	55	60	57	52	47	29	28	22	15	14	6	2	6	4							
58	32	86.7							1	3	3	7	8	2	4	2	6	1			1											
59	50	90.6								3	7	9	7	9	5	6																
60	77	96.5											13	10	17	8	5	5				1	1									
61	71	97.3											7	12	14	14	5	4	3	1											1	
62	79	102.4								2	5	6	13	12	17	16	6	4	4	3	1					1					1	
63	68	107.4										5	1	7	12	8	11	5	4	3	1	2	1	1						1	1	
64	51	112.7											3	1	9	9	5	8	4	4	3	1	1	1	1					1	1	
65	31	110.4													4	2	8	3	5	2		3			1							
66	13	117.6											1	1		1	2	2	1	1	1	1										
67	5	113.4																														
68	1	115.0																														
69	1	127.0																														
70																																
71																																
72																																

## Constants of height and weight for 14-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $r$ ).	Coefficient of correlation ( $r$ ).	Regres- sion of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	60.3	3.83±0.084	95.4	17.52±0.385	0.816±0.0104	0.795±0.0114	3.66
Girls.....	61.1	2.99±.062	99.4	14.75±.306	.692±.0153	.643±.0172	3.16



TABLE XXX.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

471 14-YEAR OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.																	
			30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119
All heights.	471	95.4	1	1	.....	.....	.....	.....	5	12	22	33	55	60	57	32	47	29	28	22
36	1	39.0																		
37	1	34.0	1	1																
38																				
39																				
40																				
41																				
42																				
43																				
44																				
45																				
46																				
47																				
48																				
49	1	73.0									1									
50																				
51																				
52	4	69.3							1	1										
53	4	68.5							1	1										
54	9	67.0							1	1										
55	14	77.2							2	4										
56	23	80.4							1	4										
57	37	83.4							1	7										
58	60	84.7							1	5										
59	47	89.7							1	2										
60	55	92.6																		
61	46	97.3																		
62	40	103.5																		
63	38	107.9																		
64	26	106.3																		
65																				
66	20	117.2																		
67	7	121.5																		
68	9	117.1																		
69	1	122.8																		
70	1	124.0																		
71	1	143.0																		
72	2	137.5																		

528 14-YEAR OLD GIRLS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.																	
			30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119
All heights.	528	99.4						1	3	4	18	25	39	60	45	88	72	47	39	36
36																				
37																				
38	1	90.0													1					
39																				
40																				
41																				
42																				
43																				
44																				
45																				
46																				
47	1	56.0						1												
48																				
49																				
50	1	85.0																		
51	1	60.0																		
52	5	71.4																		
53																				
54																				
55	11	74.1																		
56	11	85.5																		
57	18	84.6																		
58	32	86.7																		
59	50	80.9																		
60	77	96.5																		
61	71	97.3																		
62	79	102.4																		
63	68	107.4																		
64	51	112.7																		
65																				
66	31	110.4																		
67	13	117.6																		
68	5	113.4																		
69	1	115.0																		
70	1	127.0																		
71																				
72																				

Constants of height and weight for 14-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	60.3	3.83±0.084	95.4	17.52±0.285	0.816±0.0104	0.795±0.0114	3.66
Girls.....	61.1	2.99±0.062	99.4	14.75±0.306	.692±0.0153	.643±0.0172	3.16



TABLE XXXI.—*Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.*

278 15-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																													
			40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179		
All heights.	278	108.4	1			1	1	3	5	11	13	15	16	26	25	35	21	22	22	16	14	8	9	8	5	1						
42	1	49.0	1																													
65	31	115.7										1	1	2	2	1	3	11	3	3	3	1	1									
66	17	114.5											1	1	3	2	3	1	2	1	1	1			1				1			
67	13	124.3														2	3	1	2	3	1			1								
68	4	135.0														2	1	2	1	1				1								
69	2	125.0															1			2												
70	1	99.0												1																		
71																																
72																																

Constants of height and weight for 15-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( $\eta$ ).	Coefficient of correlation ( $r$ ).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	62.9	3.85 $\pm$ 0.110	108.4	20.46 $\pm$ 0.585	0.853 $\pm$ 0.0110	0.842 $\pm$ 0.0118	4.46
Girls.....	62.5	2.62 $\pm$ .069	107.6	16.38 $\pm$ .429	.543 $\pm$ .0262	.427 $\pm$ .0303	2.69

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TABLE XXXI.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

278 15-YEAR OLD BOYS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.																	
			40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129
All heights.	278	108.4	1			1	1	3	5	11	13	15	16	26	25	35	21	22	22	16
42	1	42.0	1																	
43																				
44																				
45																				
46																				
47																				
48																				
49																				
50	1	55.0				1														
51																				
52																				
53																				
54	2	66.0					1													
55	4	70.5					2													
56	10	79.6					1													
57	6	80.0					1													
58	8	80.4					1													
59	12	89.7																		
60	24	95.5																		
61	30	94.7																		
62	26	106.5																		
63	25	105.8																		
64	30	112.8																		
65	31	119.7																		
66	29	124.4																		
67	20	126.4																		
68	15	133.0																		
69	6	130.3																		
70	5	138.2																		
71																				
72	2	148.0																		

331 15-YEAR OLD GIRLS.

Height, nearest inch.	Total number of children.	Mean weight at each height.	Number of children in each 5-pound weight group.																	
			40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129
All heights.	331	107.6							1	5	14	22	22	40	48	39	38	33	20	11
42																				
43																				
44																				
45																				
46																				
47																				
48																				
49																				
50																				
51																				
52																				
53	1	157.0																		
54																				
55	3	101.7																		
56	3	85.7																		
57	4	95.0																		
58	10	90.6																		
59	17	92.9																		
60	33	101.6																		
61	35	99.9																		
62	39	107.6																		
63	53	107.1																		
64	45	113.6																		
65	31	115.7																		
66	17	114.5																		
67	13	124.3																		
68	4	135.0																		
69	2	125.0																		
70																				
71	1	96.0																		
72																				

Constants of height and weight for 15-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	62.9	3.83±0.110	108.4	20.46±0.585	0.853±0.0110	0.842±0.0118	4.46
Girls.....	62.5	2.63±.069	107.0	16.38±.429	.843±.0362	.427±.0303	2.69





TABLE XXXII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

161 16-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																																	
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184	185-189	190-194	195-199			
All heights.	161	116.7					1		1	4	5	5	7	16	16	14	21	12	18	16	16	6	1	1							1					
47																																				
70																																				
71																																				
72																																				

Constants of height and weight for 16-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio ( <i>r</i> ).	Coefficient of correlation ( <i>r</i> ).	Regres- sion of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	64.6	2.99±0.112	116.7	17.12±0.644	0.784±0.0205	0.736±0.0244	4.24
Girls.....	63.3	2.50±.081	113.6	16.24±.523	.592±.0296	.565±.0310	3.70

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TABLE XXXII.—Correlation between heights and weights of native white school children in Maryland, Virginia, North Carolina, and South Carolina.

## 161 16-YEAR OLD BOYS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																																
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184	185-189	190-194	195-199		
All heights.	161	116.7					1	1	4	5	5	7	16	16	14	21	12	18	16	16	6	1	1								1				
47																																			
48																																			
49																																			
50																																			
51																																			
52																																			
53																																			
54																																			
55	1	103.0											1																						
56	1																																		
57	5	79.0																																	
58	1	83.0					1			2	1		1																						
59	1	83.0										1																							
60	9	103.2										4	1					1	1																
61	11	98.0								1			1						1																
62	8	104.9								1			1						1																
63	12	104.8								1			1						1																
64	22	116.9								1			1						1																
65	26	117.0										1							2																
66	18	124.3											1						5																
67	18	125.6																	5																
68	19	137.2																	2																
69	7	131.1																	1																
70	2	138.0																																	
71	1	130.0																																	
72																																			
																									</										

## 219 16-YEAR OLD GIRLS.

Height, nearest inch.	Total number of chil- dren.	Mean weight at each height.	Number of children in each 5-pound weight group.																														
			45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	100-104	105-109	110-114	115-119	120-124	125-129	130-134	135-139	140-144	145-149	150-154	155-159	160-164	165-169	170-174	175-179	180-184	185-189	190-194	195-199
All heights.	219	113.6	1						1	2	6	7	15	24	35	35	27	19	22	10	5	1	1	2	2	1	1				1		1
47	1	45.0	1																														
48																																	
49																																	
50																																	
51																																	
52																																	
53																																	
54																																	
55																																	
56	1	77.0																															
57	1	88.0																															
58	1	82.0																															
59	6	97.8											2			1	1																
60	18	104.4																															
61	12	102.0																															
62	37	113.3							1	1	2	1	3	3	3	5	4	1	1	1	1												
63	40	116.6																															
64	33	113.6																															
65	35	118.6																															
66	17	125.0																															
67	9	126.6																															
68	8	133.4																															
69																																	
70																																	
71																																	
72																																	

Constants of height and weight for 16-year-old children.

Sex.	Height (inches).		Weight (pounds).		Correlation ratio (r).	Coefficient of correlation (r).	Regression of weight on height.
	Mean.	Standard deviation.	Mean.	Standard deviation.			
Boys.....	64.6	2.99±0.112	116.7	17.12±0.644	0.784±0.0205	0.736±0.0244	4.24
Girls.....	63.3	2.50±0.081	113.6	16.24±0.523	0.592±0.0296	0.562±0.0310	3.70









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